COMMENTARIES

ON

THE USE AND NECESSITY OF

LAVEMENTS.

Price 7s.

COMMENTARIES

ON

THE USE AND NECESSITY

OF

Lavements

IN THE CORRECTION OF

HABITUAL CONSTIPATION,

AND IN THE TREATMENT OF

THOSE DISEASES

WHICH ARE OCCASIONED OR AGGRAVATED BY

INTESTINAL ACCUMULATION AND IRRITATION,

OR WHICH ARE

SUSCEPTIBLE OF MODIFICATION THROUGH THE SYMPATHETIC RELATIONS OF THE LOWER BOWELS;

INCLUDING ALSO,

A COPIOUS FORMULARY OF

INTESTINAL INJECTIONS,

WITH DIRECTIONS FOR THEIR APPLICATION.

"Purgationes quoque, ut interdum necessariæ sunt, sic, ubi frequentes sunt, periculum afferunt." CELSUS, Lib. I. Cap. iii. Page 31.

BY JAMES SCOTT, SURGEON.

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TO

HENRY SULLY, M.D.

AS AN HUMBLE MARK OF RESPECT FOR HIS TALENTS AND ESTEEM FOR HIS CHARACTER;

TO

THE PROFESSIONAL FRIENDS

AT WHOSE SUGGESTION THIS WORK WAS UNDERTAKEN,

AND TO

THOSE INDIVIDUALS

WHOSE COMFORT AND HEALTH ARE IMPLICATED IN THE SUBJECT;

These Commentaries

ARE MOST RESPECTFULLY INSCRIBED,

BY

THEIR OBEDIENT AND FAITHFUL SERVANT,

THE AUTHOR.

35, Regent Street, Pall Mall.

Dec. 1, 1829.

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Preliminary Observations on the Use of Lavements, and the Abuse of Purgative Medicines.

During a visit to the French capital some few years ago, I fully ascertained that the injection of lavements was prevalent in all classes of society, and by some persons practised even habitually and daily. From farther observation of the domestic habits of the French, I found that purgative medicines were scarcely ever resorted to by unprofessional persons, except under the direction of their medical advisers; the mode above alluded to, being that, which, as a common and domestic remedy, they preferred for soliciting the bowels to their necessary and regular action. When I reverted to the popular frequency of taking opening medicines, prevailing in England, and considered, that whether on this or that side the channel, people, with the same object in view would adopt some means to effect the end desired, I could not be astonished at the popularity of the lavement in a country where neither quacks nor nostrum venders had vitiated the simplicity of instinct by the seductive allurements of a host of empirical remedies for costiveness. But thus far I saw only a demonstration of unprofessional custom, which, without farther observation, I might, perhaps, have attri-

buted to a capricious choice or national prejudice. The opportunities, however, which repeated excursions to Paris, afforded me of witnessing both hospital and private practice, did not fail to shew me that the popular custom was not only countenanced but adopted * by the profession, and I could not long remain ignorant of its simplicity and efficacy.

From this time I continued to bestow much attention to the subject, and to carry my opinions and observations into daily practice. The result is a thorough conviction on my own part, that the administration of intestinal injection has been neglected *by the profession*, to the loss of benefits which no other treatment can compensate; and *by the public*, to the injury of their health and comforts. I will go farther, and assert, that notwithstanding the aversion is rapidly wearing away, which individuals in this country have entertained to the use of lavements, and that we have among us many experienced and talented medical men who eulogise and practise it, the

* It is, without doubt, quite true, that the aversion to purgatives, so strongly entertained by French practitioners, is much owing to the doctrine of Broussais. A French writer, in allusion to the diminished trade of the preparers and venders of medicines, in consequence of the Broussaian practice, facetiously exclaims—"With what exultation will the whole class of Pharmacopolists (Chemists) view the termination of a calamitous revolution, by which their shops have been left deserted, *and their drugs allowed to rot!*"

operation is still exceedingly limited, little understood, and not deservedly appreciated, even by the few who have demonstrated its efficacy.

The use of lavements is very ancient in its origin, being referred to in the most remote medical records which have been snatched from the destructive hand of time. It has been the province of *modern* medicine to induce a disregard of its practical utility, and to supersede its application by a more entire reliance upon other modes of practice. I think I can discover that it is within the last fifty years, that this remedial agent first fell off in the frequency of its application by medical practitioners; for one can scarcely consult a medical book down to that time, without observing that injections were recommended in almost all the diseases therein discussed. In the present century most certainly the practice has been on the wane, and within my professional career (which has now been about twenty years,) it has decidedly sustained a far greater diminution. This may be, and indeed I suspect it is, owing to the ardour manifested in the prosecution of researches into chemical pharmacy and of therapeutical experiments, whereby new remedial modes and agents have been discovered, and in consequence many old ones disregarded. If, under this modern cultivation of medical routine, we are allowed to conceive that the pruning knife might have been used with

more enthusiasm than discretion, it will not much surprise us to find the operation in question cut down by a remorseless sweep, and consigned to a less prominent station in the *methodus modendi* of the present day than it formerly held. The administration of clysters never being considered as amongst the most agreeable duties of the medical practitioner, was, probably, one that he would unreluctantly forego, if a new favorite whispered a claim of superior merit; or if it were adopted, the operation, committed (as it generally was) to the management of an ignorant nurse or an infirm old woman, was not often, as one would expect in such hands, productive of sufficient benefit to support its tottering reputation. A third cause of neglect of this practice may fairly be attributed to the want of a proper and convenient apparatus for performing it, of which I shall speak more fully hereafter.

These considerations have induced me to make this appeal in behalf of a curative measure entitled to the serious attention of the profession and the public; to give my testimony of its intrinsic value; and to endeavour to shew, that its great utility entitles it to be regarded as an indispensable addition to the Materia Medica, and a valuable requisite in domestic economy.

I must intreat that it may be clearly understood, that I have no intention of depreciating the value of purgatives, or of lessening their just

importance indicated in the treatment of diseases; but I would confine them to their legitimate use, and correct that flippancy in resorting to them, which constitutes a gross abuse of their powers; converts them but too often into injurious agents, and occasions a neglect of a safer and more efficient practice. I need go no farther for corroboration of these remarks, than to the evidence furnished by the enormous revenue derived by the Government from nostrums; a very great portion of which results from the sale of *purgative pills*. This practice cannot be too highly reprobated, for such are the effects of accustomed doses of opening medicines, that the necessity for their repetition is increased by every dose, until the sluggishness of the bowels is rendered so inveterate that scarcely can a motion be obtained, except urged by the usual stimulus, which to correspond with the increasing torpidity of the bowels, requires to be augmented in strength. This effect of purgatives in exasperating costiveness, is invariably experienced from medicines of this kind; for most persons must have observed that their bowels are confined for a day or two after the operation of an active aperient. Besides these inconveniences, there are several evils attendant upon purgative remedies, particularly to weak and irritable constitutions; such as nausea, head-ache, griping, dryness of the mouth and tongue, pain in the back and hips, lassitude,

debility and general uneasiness and irritation. These symptoms are always experienced by myself even from the mildest cathartic, and I resort with the greatest reluctance to their use, even when necessary. And further, the quality of the purgatives in popular use, is but too frequently injurious, particularly pills, the basis of which most universally is *aloes*. This article acts specifically upon the lower bowel, creating heat, pain, and tenesmus; producing and aggravating piles, and occasioning schirrous diseases and ulceration of the rectum.* Again, the cause of constipation is in the large or lower bowels, and in correcting it by the use of cathartics we inflict chastisement upon the stomach which is not the offending organ; it is hard that the stomach should have to suffer for the peccadilloes of its neighbours.

The injurious effect also of reiterated purgatives are manifested in many febrile disorders, and more particularly perhaps in the exanthematous or eruptive fevers, in which the lining of the stomach and bowels is implicated in the inflammatory action, such as scarlet fever, and measles. The stimulus of purgative medicines is frequently

* One of the most horrible cases of this description which I have ever witnessed, was that of the late Mr. F—— of the Royal Exchange, who died after a protracted length of severe suffering from diseased rectum, occasioned entirely by taking aloetic pills. In all probability this gentleman possessed a predisposition to organic disease.

observed, also, to aggravate *general* fever, and certainly to increase *local* inflammation, such as of the lungs, stomach, bowels, and uterus. In some stages of typhus and other low fevers, in the latter stages of small pox, erysipelas, &c. the exhaustion occasioned by a single dose of purgative medicine may plunge the patient into irremediable debility. I do not mean to assert that it would be improper to *administer a purge* in any of these complaints; just the contrary; the state of the patient may often demand it, and the remedy in the hands of a *judicious* practitioner becomes invaluable; I speak but upon general principles, and am only desirous of pointing out the expediency of resorting to laxative enemas in diseases of this nature, in which, as the experience of every medical man shews, the regular evacuation of the bowels, (both necessary and essential to the life of the patient) may be daily procured by these safe and gentle means, whilst an injurious effect might be hazarded by contrary ones.

I request to state that it is not my intention in the following pages, to discuss the treatment of diseases farther than its immediate relation to the subject especially under consideration; I shall, therefore, in as cursory a manner as I can, point out the form and mode of administering injections in various morbid affections, in which the relief and advantages obtained from their use cannot be equally procured by any other means.

Critical Remarks on Lavement Machines.

A powerful obstacle to the use of clysters has always existed in the difficulties attending the operation; these were of two kinds: 1st, In the clumsy and inadequate construction of lavement instruments; and 2ndly, In the violation of delicacy, connected with their employment. The apparatus formerly most generally adopted, (as being at any time easily and speedily procured and fitted up,) was an ivory pipe and a bladder; the employment of which was always attended with more or less difficulty, and frequently terminated in disgusting failure. Its inapplicability to many circumstances, particularly to *self-injection*, and its utter inadequacy to cases of obstinate obstruction where mechanical power was essential, constitute objections to it, sufficient to render it almost useless. The elastic bottle is liable to the same objections, and has this additional evil, that the grasp cannot be relaxed for a moment, unless the stop-cock be turned or the pipe withdrawn, without the injection being sucked back into the bottle.

The French and other clyster syringes (capable of holding a pint or more) are much too large to be either convenient or efficacious: in the first place, if there be any obstruction in the intestinal

canal, or the bowels oppose the passage of the injection by any degree of reaction, (which they usually do) the force necessary to propel so large a column of fluid requires the arm of Sampson or Hercules; and, secondly, the clumsy size of these instruments renders their use so inconvenient, that the patient is often much hurt by attempts to effect the operation.* Besides this, whenever it may be necessary to inject a large volume of fluid (as it sometimes is, even to the quantity of several quarts) the operation is unavoidably suspended as often as the instrument requires to be recharged, and this, perhaps, several times successively.

The newly invented syringe, the action of which is effected by turning the handle at each stroke of the piston and re-turning it at every discharge of the instrument, is too complicated for general, and certainly too inconvenient for domestic use. The least inattention in using it would baffle the operation, to say the least of it; for, in one instance, if the handle be not precisely turned, the liquid instead of being thrown into the bowels

* Under an attack of dysentery many years since, the surgeon who attended me administered an opiate injection from a pewter syringe, about a foot long, and the size of one's leg, with a long crooked stem, which was pushed up the rectum. The severe pain occasioned by the passage of this rude pipe, and the poking of its point first against one side of the bowel, and then the other, from the unsteadiness of the hands and arms of the operator, compelled me to refuse to have the injection repeated, and was such as I can never forget.

would be *forced back into the vessel;* and in the other, should the turn be neglected, the syringe instead of being filled by the liquid from the basin, would *draw back* the contents of the bowels *into it.*

A syringe of still more recent invention with sliding valves, and another, the valves of which are rotated with keys like a German flute, are complex and liable to derangement.

The stop-cock syringe gives too much trouble in turning, and is, in common with the three preceding, highly annoying to nervous and irritable persons.

The condensing pump lavement machine is liable to a serious evil, which is, that part of the confined air often rushes through the liquid and passes into the bowels along with it, occasioning, of course, mischievous and hazardous consequences. And again, the liquid is forced out by the expansive power of the compressed air within the canister, and, therefore, the degree of propulsion *lessens* as the operation *proceeds,* which is directly the reverse of what ought to happen; for with an accumulating volume and resistance anteriorly, the propelling power should be proportionally increased instead of diminished.

There is also another lavement instrument, through the handle of which the liquid is forced into the bowels by the weight of the patient's body. The position of the pipe, the motion occasioned in the descent of the piston, and the un-

steadiness and liability to overthrow of the vessel, all concur in threatening injury to the rectum. The patient has likewise no means of regulating the force of injecting the fluid, which it is essentially requisite should be lessened, or suspended according to the sensations produced. In cases of irritable or inflamed piles, the patient cannot bear the pressure necessary for impelling the enema into the bowels.

None of these objections apply to an injecting instrument manufactured by my ingenious neighbour, Mr. John Read, which is a small pump, only three quarters of an inch in diameter and three inches and a half in length, receiving about a table-spoonful of liquid. To the side of the pump or syringe is screwed a long flexible tube, with an ivory pipe attached to the end, which (when the instrument is used) is inserted into the bowel, and the patient sits down upon it. The syringe, which is open at its lower end, being plunged into a basin containing the liquid placed upon a chair opposite, any quantity can be pumped from it that may be desirable. The peculiar mechanism of this instrument prevents it from becoming deranged, whilst the simplicity of its construction and action enables even an invalid to use it readily and without embarrassment. An infirm patient may employ it without the presence of a second person; or in cases of severe illness, the tube being passed under the bedclothes, the operation may be performed by an

attendant without the slightest exposure of the person of the patient.

Notwithstanding the small size of this instrument, a large quantity of fluid may be injected in a very short space of time; in fact it may be made to pass with a velocity not requisite in any case, *viz.* at the rate of *three quarts per minute.* An erroneous notion prevails with regard to the comparative power of large and small injecting syringes, it being generally imagined that obstruction may be overcome more certainly with a bulky instrument. Such a conclusion is at variance with mechanical principles, for it is a fact well ascertained in experimental philosophy, that as volume is lessened, friction is diminished, and in proportion to the diminution of friction is the increase of power. Read's syringe is very much superior to any other hitherto invented, and is decidedly *more durable.* This latter quality is really as essential as any other, not only on account of the expense which is constantly incurred, in repairing worthless instruments, but from the inconvenience (and, perhaps, something worse,) attending their being out of order at a time and place not possible for the possessor to get them mended. Upon the whole, Mr. Read's instrument stands unrivalled, and reflects great credit upon his ingenuity; indeed, I consider the community are under considerable obligations to him, in thus furnishing them with an apparatus so admirably adapted to further the objects of

medical science, and to secure to the public the benefits of an important domestic remedy; and such, I believe, is the feeling generally and justly entertained of the merits of this invention.

On the Influence conferred by the sympathetic Relations of the lower Bowels upon Intestinal Injections in the Treatment of Diseases.

In considering this subject, it is necessary to inquire into the capabilities of the *lower bowels* of receiving impressions from external agents, and of reflecting them upon other organs and parts of the body; it is also due to the interests of the medical art, that I should state the grounds upon which this mode of practice is adopted. This I shall hope to do before I close the subject, in the most convincing manner; but first, let us revert to the original proposition.

Although the *lower* portion of the intestinal tube is far less abundantly supplied with absorbent vessels than the *upper*, and less exquisitely organised than the *stomach*, it is, notwithstanding, possessed of the faculty of absorption to a considerable extent, and of nervous and physiological relations capable of exerting powerful sympathies with various and distant parts of the body. The absorbing power of the mucous membrane of the

colon and rectum, is evinced by its action upon the fœculent matter passing through the canal, which is semi-liquid at its entrance into the cæcum from the ileum, gradually becoming inspissated and of a firmer consistence as its moisture is abstracted by the absorbent vessels in its course through the colon, and assuming a compact and solid form in the rectum. It is probable that remaining portions of nutritious matter also, which may have escaped or been rejected by the lacteals of the small intestines, (where the digestive function most especially resides,) are taken up by the less fastidious absorbents of the large bowels; indeed, this fact has been proved by some anatomists, who have discovered chyle in the absorbent vessels passing from the colon. Another illustration of the same fact is shewn in the effects of administering soups, broths, milk, &c. in the way of clysters, by which practice persons have been kept alive without receiving food into the stomach.

The physiological relation of the lower bowels with the *nervous* system, is demonstrated by the experiment of injecting spirituous liquors into the rectum, by which, not only is intoxication produced, but it even ensues MORE QUICKLY *than if the same had been taken into the* STOMACH! It is said that the virulent effects of several poisonous substances are exaggerated, when the articles are administered clysterwise; and camphor, by this mode of exhibition, speedily exerts a powerful effect upon the nervous system. A case is related

in the Transactions of the French Academy, of a female patient, who was immediately intoxicated by an injection composed of brandy and camphor; she asserted that she tasted the brandy very quickly after its immission into the rectum.

In cases of protracted labours, from deficiency of pains, I have, sometimes, succeeded in arousing uterine action by injecting into the rectum an infusion of horse-radish, savin, or other *exciting* stimuli, procurable on the occasion; and it is probable, that an infusion of ergot of rye would act more speedily and certainly in this manner, than by being taken into the stomach.

The effect of *narcotic* injections in relaxing morbid rigidity of fibre in the muscular structures of the body, is exemplified by the administration of the *tobacco* enema, in cases of strangulated hernia, tetanus, suppression of urine, &c.; and of *opium* in the treatment of stricture, calculous and nephritic diseases.

Hysteria, Asthma, &c. are relieved by the *antispasmodic* influence of injections of assafœtida or camphor; and flatulent colic, suppression of urine, &c. by turpentine.

Tonic injections become eminently useful and necessary in some fevers, ague, &c. when the stomach is unable to retain, or the patient incapable of swallowing bark.

Astringent clysters are indicated in chronic diarrhœas, hæmorrhoids, prolapse of the anus, &c.

Warm and Cold injections of simple water act beneficially, from their temperature: the former as an internal fomentation to contiguous parts, as the uterus, bladder, kidnies, and other organs; and the latter from their direct refrigerating influence in piles, uterine hæmorrhage, &c.

A strong sympathetic action is unquestionably excited in the small intestines and stomach by the stimulus of enemata upon the large; for I have had many opportunities of observing the cessation of vomiting soon after the administration of an injection, but *previously* to any cathartic effect ensuing. This may be considered to arise from the primary or sympathetic action of lavements; an effect that ensues from the administration of *water only;* but if we add *medicinal* substances to the liquid, such as salts, senna, colocynth, jalap, &c. and suffer them to be retained, then the usual phenomena of *purging* take place after a given time, in the same manner as though the remedy had been swallowed: this is produced, unquestionably, by the absorption of the ingredients of the enema. By the stimulus of such an injection, a powerful excitement is produced not only in the whole alimentary canal, but in the constitution at large, giving a temporary stimulus to the nervous and vascular organs of the whole system; whilst, as was remarked, by an experienced and accurate observer, "the vital properties of the mucous membrane of the colon are developed, the blood flows in greater quantity

and with greater force into the capillaries of its texture, which becomes swelled, reddened, hotter, and more sensible; in short, a determination of blood and nervous excitement is made *pro tempore* to this portion of the canal, which becomes a kind of center of vital action for the time."

Thus are enumerated a few examples of the therapeutical agency of various articles in the form of lavement, and instances of the vital capabilities of the lower bowels of receiving impressions, and of communicating them to other organs.* I have, however, in this place, offered but a brief sketch of the system, as I shall hereafter, give distinct formulæ for preparing lavements suitable to those diseases in which my experience has confirmed their utility.

* It is sometimes seen that costiveness is occasioned by an undue muscular action of the sphincter ani, and I have no doubt, but that in these cases, a jet of *warm* water, in the manner of the French "Douche Ascendante," directed for a few minutes against the anus would relax its rigidity and procure evacuations. The manner in which Read's Self-Injecting Lavement Instrument is fitted to the Bidet, renders it very convenient and suitable for this operation, which may be effected by holding the curved rectum pipe at two or three inches distance from the anus, whilst the liquid is thrown against it by the pump. The value of this Bidet Injecting Apparatus is not confined to its convenience in taking a lavement, for with *females* it has a still more important use. It is, in fact, indispensable to every woman, who, in being convinced that attention to the person is necessary to health and comfort, should endeavour to ensure both by *that kind of ablution* which can be accomplished by *means of this nature* only. The sex are indebted for the construction of the female pipe to Dr. Granville, whose general eminence as a physician, is enhanced by his practical knowledge of feminine diseases and constitution.

On the Eligibility of Intestinal Injections, shewing that the Efficacy derived from their Use cannot be equally obtained by any other Means.

In the following remarks on the use of injections, I shall endeavour to shew, (and I have no doubt of doing so satisfactorily) that it is not merely a remedy chosen from the routine list of curative means, without stronger reasons for determining the selection, than its being one amongst the number; but that it is often an imperative and indispensable measure, possessing an *efficacy, no other means* can supply.

In illustration of this remark, I shall first allude to a fact with regard to the *relative* effects of purgative injections and cathartic medicines, that has been hitherto too commonly overlooked; I refer to the general inadequacy of aperients to clear thoroughly the intestinal canal. Every professional man, must frequently have observed in his practice, that the exhibition of purgatives, in many cases produces but a trifling benefit, and often none, *notwithstanding they may act with energy and procure numerous liquid evacuations;* but if a *copious* enema succeed the medicine, bulky and voluminous motions are discharged, attended by complete relief to the patient. I have witnessed innumerable cases, where, after the most active purging, actually amounting to hypercatharsis, the administration

of a copious injection, has brought away fæces of such a hardened consistency and figure, as left no doubt, but they must have remained impacted in the colon, undisturbed by the previous remedies. I have known persons kept under the influence of cathartics for many days in succession, passing six lax motions or more daily; but, after all, upon an enema being thrown up, they have discharged a quantity of bulky fæces, so great as to excite astonishment. I have devoted much attention to the effects of purgative medicines, and the papers which I published some years since, upon the peculiar action which the various cathartics exert upon particular portions of the alimentary canal, shew that I am sufficiently aware of the specific influence of certain articles of the *Materia Medica* upon the large intestines; but I do not hesitate to assert, that these remedies, administered by the mouth, have not the power of unloading the colon and rectum in an equal degree with a copious injection. Indeed, I am almost led to conclude, that cathartics *never entirely* purge off the effete matter of the lower bowels, and that in most instances, *solid* fæces *remain* in them, *after* the operation of opening medicine has ceased; this opinion is strengthened by examinations which I have made after death. I could enumerate many cases of the retention of vast quantities of fæces in despite of purgatives of all descriptions and of the utmost power, which

yielded to the influence of injections; but my limits forbid the detail.

There are many persons of weak and irritable constitutions, who suffer severely from the action of purgative medicines, as I before remarked, at page 5. To such persons the use of a lavement is almost a blessing, as it relieves them without any of the temporary torment inflicted by taking medicine, and as such persons are exceedingly subject to costiveness, the lavement is a boon of no small value. It is no less necessary to those who are subject to piles, or are the victims of structural disease of the parts about the anus. These diseases are seriously aggravated by an injudicious use of purgatives, and I have seen the utmost distress and danger inflicted in cases of stricture of the rectum, by large quantities of fæcal matter being driven downwards by aperient medicine, and retained at the contracted part until removed by the immission of a lavement.

When opening medicine has been taken, and is tardy or doubtful of operation, its effects may be quickened or better insured, by using a lavement of warm water; and if this latter measure be determined on *previously* to the administration of the purgative, the dose may be lessened in quantity, and the lavement thrown up a few hours after, to assist the operation. The griping of purgatives, especially the resinous and drastic, is also relieved by lavements of thin gruel, starch,

decoction of lin-seed or marsh-mallows, and other bland liquids. These mucilaginous injections are eminently useful in sheathing the acrimony of corrosive and metallic poisons, and protecting the mucous membrane of the bowels from their irritation.*

The peculiar eligibility of injections, is in no disease or circumstances more strongly marked out than in fever. In this class of diseases, the stomach and bowels are the organs on whom the first morbid impressions are made. Their secretions become vitiated, and the motions acrid and fœtid. The acrid and septic particles of the fæces prove exceedingly injurious when absorbed and carried into the blood; and it is of the first importance therefore to prevent their retention, and preserve the intestines free from irritation. But this cannot be done through the course of protracted fever, by the repeated administration of purgatives, *without weakening the tone of the stomach and bowels*, and, consequently, by sympathy, *inducing debility of the whole system*. The late Dr. James Curry, than whom no physician

* I had an example of this, in a female who attempted suicide, by taking an immense quantity of sugar of lead. I applied the pump, and ejected the last particle of the poison from the stomach; but so large a portion of it had passed into the bowels, that there was great danger of the miserable patient's falling a victim to this secondary calamity; happily the instrument, which performs a double operation, enabled me to evacuate the remaining poison by lavements.

who has ever lived, better understood these matters, laid great stress upon this point; "if we lose the command over these organs," he said, "we lose the command over the constitution of the patient." Simple lavements of warm water merely, should, therefore, be administered, three times a day during the course of fever, to dilute and wash away the morbid contents of the colon and rectum, and improve the secretions of the mucous membrane of the canal. Small doses of rhubarb or castor oil once daily, in conjunction with lavements, will be sufficient to cleanse the stomach and small intestines.

In typhoid fevers, diluted vinegar is often recommended as an injection and fermenting mixtures of yeast and beer; in short, the above mode of treatment in fevers will appear highly necessary, when all the circumstances I have previously stated, and those which I shall, hereafter, describe with the formulæ for preparing injections, are properly considered.

The eligibility of injections is particularly apparent in cases where the locality of the disease confers efficacy on their application, such as of *cold* water for prolapsus uteri, piles, uterine hæmorrhage, &c.; of anti-inflammatory injections of Goulard or zinc for hæmorrhoidal inflammation; of astringent injections in prolapsus ani, relaxation of the rectum, or of the sphincter muscle, diarrhœa, &c.; of stimulating irritants for the

destruction of ascarides; of *warm* water as a relaxant for stricture, retention of urine, &c. which is also extraordinarily beneficial in lumbago, if used in the warm bath.

Injections may also be rendered indispensable by the patient being unable to swallow, as in cases of stricture of the œsophagus, severe quinsy, malignant sore throat, or during an irritable state of the stomach, when the organ immediately rejects every thing by vomiting. Under suspended animation, the injection of ammonia, or brandy with hot water, is highly necessary.

The state of the stomach is not such as will at all times endure the kind of medicine necessary for the disease, as bark, &c.; and in some cases it would be manifestly improper to administer the necessary remedy by the mouth, as tobacco, for instance, in the treatment of strangulated hernia. There are also many cases in which the stomach would be disordered by a medicine, or its rejection ensue, without any beneficial effects; both of which may be obviated, and our intention fulfilled, by using the remedy as an enema. On this account, turpentine, opium, assafœtida and tobacco, are frequently thus applied.

We have yet to learn whether the controling influence of digestion, may not so far influence or modify the effects of medicines introduced into the stomach, as to deprive them of many useful effects on the system, which may probably be

obtained by a contrary mode, and whether we may not still farther and usefully extend the practice I have here undertaken to advocate.

General Remarks on the Causes, Prevalence and Effects of Constipation.

It may be inquired what is the state of the bowels that obtains the name of Costiveness? The designation expresses the *omission of a daily evacuation by stool,* or *the motions becoming so hard and dry as to be discharged with pain or difficulty.* The effects of costiveness, as thus defined, are discovered to vary considerably with different individuals; to some it becoming habitual to have their bowels relieved but once in two or three days, a week, a month, or even longer, and yet continuing in good health. Such aberrations, however, can be attributed only to a peculiarity of constitution or circumstances not very prevalent, and do not invalidate the descriptive character above given. But still, costiveness must be regarded rather as a relative than a positive condition, depending upon the constitutional effects for its true character. As long as the body preserves its perfect health, a slow action of the bowels cannot, with propriety, be considered mor-

bid, though they should be relieved but once only in three or four days. This condition may be one of a series of actions instituted by nature, upon the harmony of which the balance of the constitution and the preservation of health depend. Indeed, I have been strengthened in this opinion by observing the disturbance, nay temporary illness, induced by the premature exhibition of a purgative to persons possessing good health, but who, being naturally costive, have endeavoured to correct it by aperient medicines. No doubt, however, can exist for a moment, of the injurious nature of a slow action of the bowels, whenever symptoms are present indicative of intestinal irritation; sickness, head-ache, fœtid breath, flatulency, inflammation of the eyes, fever, cough, uneasiness or tumefaction of the belly, combined with a confined state of the bowels, are pretty certain signs of its existence.

A strong and robust habit of body seems to be connected with a slow action of the bowels; but it must be also allowed, that costiveness sometimes arises from a weak state of the intestinal canal. It is said also, that very laborious employments render the bowels costive; but however this may be, I believe that the want of sufficient exercise is a much more frequent cause. Diet consisting of too much solid food, especially of lean meat, game, and other stimulating articles, induces costiveness, and the use of port wine and strong malt liquors add to these effects. The bowels may also be

brought into an irregular state by inattention to the claims of nature; this is a fertile cause of the complaint in females, and is often established in early life by the restraints and confinement of schools.

Constipation, as the exciting cause of numerous diseases, has been regarded by many physicians as the destruction of half mankind; how nearly the number may approximate to this alarming calculation I am not prepared to state; nor is it in truth, a fact upon which we can acquire a precision in evidence sufficient to enable us to decide in such positive terms. Some persons have said, that those who are costive from an early period of life, rarely attain the age of forty years; if this be correct, it would be an interesting inquiry to ascertain how it operates in shortening life. From my own observation and inquiries into this subject, as well as from the opinions of many respectable medical writers, it seems quite certain that a costive state of the bowels is one of the most general conditions of the body that prevails in civilised society, and though but little noticed by individuals whilst unattended with pain or personal inconvenience, yet it seldom fails to lay the foundation of disorders, that either prove fatal to life, or tend materially to embitter and disturb it.

It is curious to observe, how soon after our entrance into life, do we become the victims of constipation. It is usually the earliest symptom of

disorder experienced by *infants*, and even within the first twenty-four hours after birth, inflicts very severe suffering upon the babe, whose bowels have not exonerated themselves of the meconium. From this period, through all the succeeding stages of life, constipation is a source of serious evils to both sexes. In *male* youths it occasions a tendency to diseases of the lungs and other vital organs, and if neglected after the meridian of life is passed, induces a loaded state of the vessels of the head, that often terminates in apoplexy or palsy. To the *female* constitution, costiveness is not less destructive; retarding the appearance of the menses, or interrupting them at an important season of youth, when their regularity is indispensably necessary to give health to the constitution, and fit it for its future destinies; and when morbid impressions are easily made upon the organs of vitality, of which consumption and other fatal diseases are the consequence. At a more advanced period of life, when the functions peculiar to the sex have ceased, constipation of the bowels lays the foundation of painful and equally serious diseases.

To persons of every variety of habit, under all circumstances, in all situations, and at all ages from the cradle to the grave, costiveness must and will prove an injurious attendant. If disposed by hereditary transmission, by peculiarity of formation, or by acquired liability to certain

constitutional affections, as gout, consumption, or scrophula, constipation gives life to the seeds from which they spring, and establishes diseases, that, but for its baneful influence, might never have been developed. It has also been observed, that it predisposes the body to the reception of contagion, rendering us much more obnoxious to the influence of its causes whenever we may happen to be placed within its range. An increased susceptibility to diseases in general, and *to some in particular*, is in fact engendered by costiveness; of the latter I cannot adduce a more striking example than yellow fever and other disorders that prevail in hot climates.

The severity of almost *all diseases* is increased by constipation; the sympathetic influence of the bowels extending itself to all parts of the system. We observe most particularly the effect of this influence in *fevers*, and the necessity for a proper and regular evacuation of the alimentary canal is universally understood; in fact, in medical practice, it forms an important indication of cure never to be safely dispensed with.

Old age is peculiarly characterised by a prevailing state of constipation, arising from diminished irritability and propulsive power of the intestines. At the age of sixty, senility may be considered as commenced, and from this period the bowels become more torpid from the natural insensibility arising from age, and the increasing

weakness of all the muscular structures of the body; to which, most probably, a diminution both in the quantity and stimulating quality of the bile contributes. The function of the digestive organs being also equally impaired, a large quantity of undigested aliment passes into the bowels, where it is detained and becomes acrid and putrescent, giving rise to numerous serious symptoms.

On the Tendency to Constipation, *and its injurious Consequences to the* Female Sex; *shewing the Necessity of removing it by simple Lavements.*

Females, by formation and other natural causes, possess an inherent liability to costiveness, and few of them, if any, escape entirely its injurious consequences. Its morbid influence upon the general health is strongly marked in the youthful constitution. The girl becomes pale or yellowish, and falls away; her appetite diminishes, (this is not, however, invariable,) the tongue is furred, the breath offensive, the gums swollen, and she complains of pain in the side; her breathing is short upon going up and down stairs or upon quickening her pace, and she has oftentimes a short hacking cough, palpitation of the heart,

and head-ache; the lips sometimes crack, and the teeth become encrusted or carious; pimply eruptions break out upon the face, whilst various parts become puffy. This disturbance of the general health frequently deranges the system peculiar to the sex, checking altogether its function, or leaving its action incomplete and irregular. The bosom now sympathises with its associated organs, and lumps or tumors form in one or both breasts.* Young persons, who are habitually costive, frequently complain of pain at the pit of the stomach, so severe at times as to give rise to spasm. It appears to be entirely sympathetic with the large bowels, as the tongue continues clean, and the digestive process uninterrupted.

The evils of this period having been escaped or subdued, the female is yet again to become obnoxious to intestinal disturbance, by a state of things induced by child-bearing. Costiveness is almost an invariable attendant on pregnancy,

* I was consulted, a few weeks since, by Mrs. L——, respecting her daughter, a young lady of 19, who had a painful swelling in the left breast. Upon examination, I discovered derangement of the general health that gave sufficient warrant for attributing the local affection to a disordered state of the bowels. The sequel shewed I had not been mistaken, for under the method which I advised for duly unloading the bowels, the tumor in the breast speedily subsided, after having, for a long time, resisted various local and constitutional remedies.

and many distressing symptoms and feelings are occasioned by it. During pregnancy such an immense volume of fæces has been known to collect in the bowels, as to destroy the patient. Dr. Lemazurier has reported the case of a lady, who died after delivery, from this cause; and whose colon was so enormously distended with fæces that had accumulated during her pregnancy, that it measured the prodigious size of a foot and a half in circumference; and, as I have calculated, its contents could have been very little less than a bushel by measure. The patient had recourse to medical advice, two months before her confinement; but her physician declined any attempts at unloading the colon, from an impression that it would be impracticable until after her delivery; an unfortunate conclusion for the poor patient, whose life might probably have been saved under proper treatment. A case is also narrated by Dr. De Leon of Colombia, of a collection of fæces during pregnancy, amounting to *seven gallons;* the intestines measuring *thirteen inches* in circumference. The patient died a few hours after delivery.

It has been correctly remarked by Dr. Marshall Hall, in his Medical Essays, that the injurious effects of constipation are not experienced at all times, though the cause be never absent; but are developed by accidental circumstances that prove exciting causes; as colds, fatigue, injuries,

shocks of the constitution, &c. which are much more likely to induce the morbid consequences of the latent disease, in females than in the other sex; the state of *parturition,* is a period peculiarly obnoxious to their occurrence. Dr. Hall is an attentive, patient and acute observer of nature, and a close reasoner upon bed-side facts; hence he may be followed as a safe guide in tracing causes and effects through a chain not obvious to superficial inspection, and I cannot, therefore, too strongly recommend his medical researches to general attention.

The female sex, beyond doubt, are peculiarly liable to an overloaded state of the bowels, and are powerfully and injuriously affected by it through the whole course of their existence. Happily the remedy is obvious, of easy application, and may be resorted to, in most cases, with the best hopes of success. I shall divide female life into the various stages of *Youth—Pregnancy—Parturition—Weaning—Middle Period of Life—Cessation of the Menses* — and *Decline of Life* — and shall pass in review the effects of constipation upon each state respectively.

Youth.—In the treatment of disorders attending this time of life, the remedy to which I alluded (the warm water lavement,) has been, from a mistaken and misplaced delicacy, entirely withdrawn from young women. I attempt not, however, to combat with the prejudices of mankind,

otherwise than by holding up a representation of their interest, and shall, therefore, pass at once to remark, that the lavement is unquestionably the most rational as well as the most effectual mode of relief, and may be safely and efficaciously adopted at all periods of life, from youth to old age. Parents and conductors of seminaries ought to be aware of these facts, and be provided with the means of administering the remedy. No girl should be allowed to pass the second or third day with constipated bowels, without receiving a lavement of warm water. The evacuation should be examined, and if little or no feculent matter has been discharged, the lavement should be repeated in an increased quantity. It is very common for the contents of the bowels to elude the first, and even reiterated injections; but a persistance in the application never fails in ultimate success, and the prodigious bulk of solid motions often evacuated in this manner is truly astonishing.

Pregnancy.—The great change produced in the uterine system by impregnation, is accompanied by no less an effect upon the stomach and bowels, through which the balance that hitherto equipoised the actions of the alimentary canal, becomes disturbed; and uneasiness and irregularity, in these organs, characterise the pregnant state. The free and regular action of the bowels are interrupted by the pressure of the enlarging

uterus upon the rectum and colon, the propriety of obviating which, by purgative medicines, is properly considered, very questionable; as there are not wanting instances of miscarriage and other serious consequences occasioned by their use. The value of lavements can, therefore, in no case be more highly appreciated than during pregnancy, and the occasional administration of an enema becomes indispensable. A quart of tepid water, in which a table-spoonful of soft soap is dissolved, may be used twice or three times a week, or oftener, if the patient be troubled with piles or tenesmus. It has been recommended that she should recline upon the *right* side during its administration, that the pressure of the uterus might be removed from the colon as it descends upon the *left*. As labour approaches, the bowels should be unloaded by as copious an injection of warm water as can be borne, which should be repeated every twenty-four hours if the labour prove tedious. Dr. Marshall Hall, in his admirable "Commentaries on the Diseases of Females,"* speaking of the prevention of child-bed disorders, says, "I believe no means would induce so much to this purpose as the invariable administration of copious warm water injections at some period before or during labour. The large intestines would thus be re-

* A work that cannot be too highly praised. I would most particularly recommend it to the perusal of my readers.

lieved of their load, and a great and fertile source of future disease would be removed."

Parturition.—In the lying-in state, constipation is also productive of disease and danger, and the most sedulous attention to the state of the bowels after delivery is requisite. The utility of lavements is manifest, in the quantity of fæces which they frequently dislodge at this time, and they ought never to be dispensed with. Two or three pints of warm water may be thrown up every morning, which will, in most cases, secure the patient from fever, lessen the pains that succeed parturition, keep down irritation, procure refreshing sleep, and preserve her in comfortable sensations and repose. Instances, of course, will occur, when from an excessive secretion of milk, painful distension of the breasts with symptoms of inflammation, purgatives and a more active treatment is necessary; but I place such cases out of the verge of common occurrences.

In the treatment of puerperal convulsions, the administration of opiate injections is of the highest importance. Dr. Denman advises *six grains* of opium to be dissolved, (in a little gruel or thin starch,) and thrown up as an enema. Opium does not, when used in this manner, affect the brain as when taken into the stomach, whilst, as I explained in a former chapter, it tends to quiet in a more direct manner the contractions of the uterus, and, consequently, the convulsive motions of the system. In threatenings of abortion, opiate

injections are also beneficial. A dram of laudanum mixed in a teacupful of starch, may be injected; a lavement of warm water having been first administered to clear the lower bowels.

A loaded state of the bowels after confinement, is created obviously by the protracted torpor and distension of the lower intestines from the pressure of the child during pregnancy; and the consequent accumulations in the canal are productive of *irritation*, which is but too commonly mistaken for *inflammation*. It is not my intention to point out here the distinguishing marks by which the one is to be known from the other; but I must insist upon the fact, that the former is much more prevalent than is generally suspected, and gives rise to affections of the brain and other destructive puerperal disorders.

Weaning.—In the process of weaning, it is requisite to preserve the bowels in a lax state, in order to lessen the secretion of milk and prevent inflammation and suppuration of the breasts. I have always found that this is accomplished quite as well by the administration of purgative injections as by taking medicines, and certainly much more agreeably to the patient. For this purpose, active clysters should be used every day, until the secretion of milk has subsided, and the breasts become soft and flaccid. Half an ounce of senna, boiled ten minutes in half a pint of water, and to the strained liquid an ounce of Epsom salts and half an ounce of tincture of jalap added, form a

very proper injection. It should be suffered to cool, below blood heat, thrown up slowly, and allowed to be absorbed.

Middle Period of Life.—The complaints to which females are naturally liable, are very considerably aggravated by a loaded state of the bowels at the middle period of life. Discharges of some kinds are, probably, aggravated, or even occasioned by intestinal irritation; but, certainly, they are much relieved and often removed by keeping the bowels unloaded, by the use of simple warm water lavements. Hysterical and nervous symptoms are also much benefitted by a similar practice. In cases of diseased uterus, the pressure of hardened fæces in the rectum produces pain and irritation: the contents of the lower bowel should, therefore, be removed once or twice a day, by the immission of a simple lavement of water, the mere warmth of which, often mitigates the anguish under which the patient suffers. With this view the fluid may be thrown up at a temperature of about 106 degrees of Fahrenheit's scale. Injections also of opium, hyosciamus, or hemlock, are useful in lessening the pain.

Cessation of the Menses.—From the period at which the "change of life" takes place, intestinal accumulation induces serious and fatal diseases. The administration of lavements is in such circumstances attended with the most beneficial effects, and is the sheet anchor of security. From this period, it should be every female's re-

sort against constipation; and notwithstanding the bowels may be spontaneously relieved daily, an injection of three pints of warm water every five or six days will facilitate the complete expulsion of their contents to a degree that the unassisted efforts of nature are incompetent to effect.* It should, of course, be repeated oftener, if the state of the bowels requires it. If the system be full, and there be pain in the head, giddiness, or a sense of bearing down, a purging injection, similar to that directed at weaning, should be used every second or third day, until these symptoms disappear.

Decline of Life.—Females, as I before remarked, being more liable to constipation than the opposite sex, the complaints to which they are subject in the middle period of life, are to a very considerable extent, occasioned or seriously aggravated by a loaded state of the bowels; but it is towards the decline of life that the disorder is pregnant with important consequences, and the female should be scrupulously exact in correcting it. From the period of the cessation of the menses, the health and safety of the constitution seem to be peculiarly, even more than ever, dependent upon the state of the bowels. The intestinal canal actually exerts a perfectly despotic government over the rest of the system,

* Query—Would not the fomentative effects of daily administered clysters prevent structural disease of the uterus, so common at this critical period of life?

and Cancer, Jaundice, Dropsy, Phrenitis, Palsy, and Apoplexy, are the tyrants which it sets up to torment and destroy life. I should be betrayed far beyond the limits I have prescribed for these pages, if I were to enter upon an exposition of the manner in which these and various other disorders are influenced by intestinal irritation; but such is the fact, and this the conclusion that no female can pass through the decline of life either in comfort or safety, without a strict, marked, and unremitted attention to the bowels.

The bowels, in the declining years of female life, demand a cautious attention; for, although there exists a peremptory necessity for preventing accumulation of their contents, this can by no means be safely attempted or properly accomplished by sufficient doses and repetitions of purgative medicines, the effect of which is to debilitate the stomach and alimentary canal, and, consequently, to enfeeble the powers of life. The safest plan, therefore, of preventing intestinal irritation, is to unload the bowels by the use of injections, (to which a warm stomachic aperient may be occasionally added,) and thus, the general health being assured against a principle that tends powerfully to undermine it, local diseases which follow in the wake of constitutional disturbance, may be diverted, and life itself protracted. These remarks upon old age apply equally to both sexes.

Graphical Delineation of the Stomach and Bowels, with a Description of the Position and Course of the Alimentary Canal.

The *abdomen*, or belly, is that part of the body which contains the stomach, bowels, liver, and some other viscera. The abdomen (derived from the Latin word *abdo*, to hide,) is a cavity of an oval figure, arched on the *fore side* by soft parts, called the abdominal muscles; covered *behind* by the spine and the muscles of the loins; bounded *laterally* by the six lowest ribs, the ilia, (or hip-bones), and by muscles filling up the space between the two on each side; and, lastly, separated from the chest *above*, by a strong muscular partition, denominated the diaphragm.

The abdomen is convex anteriorly and concave posteriorly; (the latter is called the hollow of the back or loins.) This convexity and concavity are *greatest* when the body stands erect; (the bowels being protruded forwards in that position,) in sitting, they are considerably *lessened*, and in a horizontal posture (on the back) they are still farther diminished, the bowels being then less prominent, and the abdomen more tense; if, however, the thighs are drawn upwards, the latter becomes lax.*

* Practical inferences may be drawn from these facts, which I shall notice hereafter.

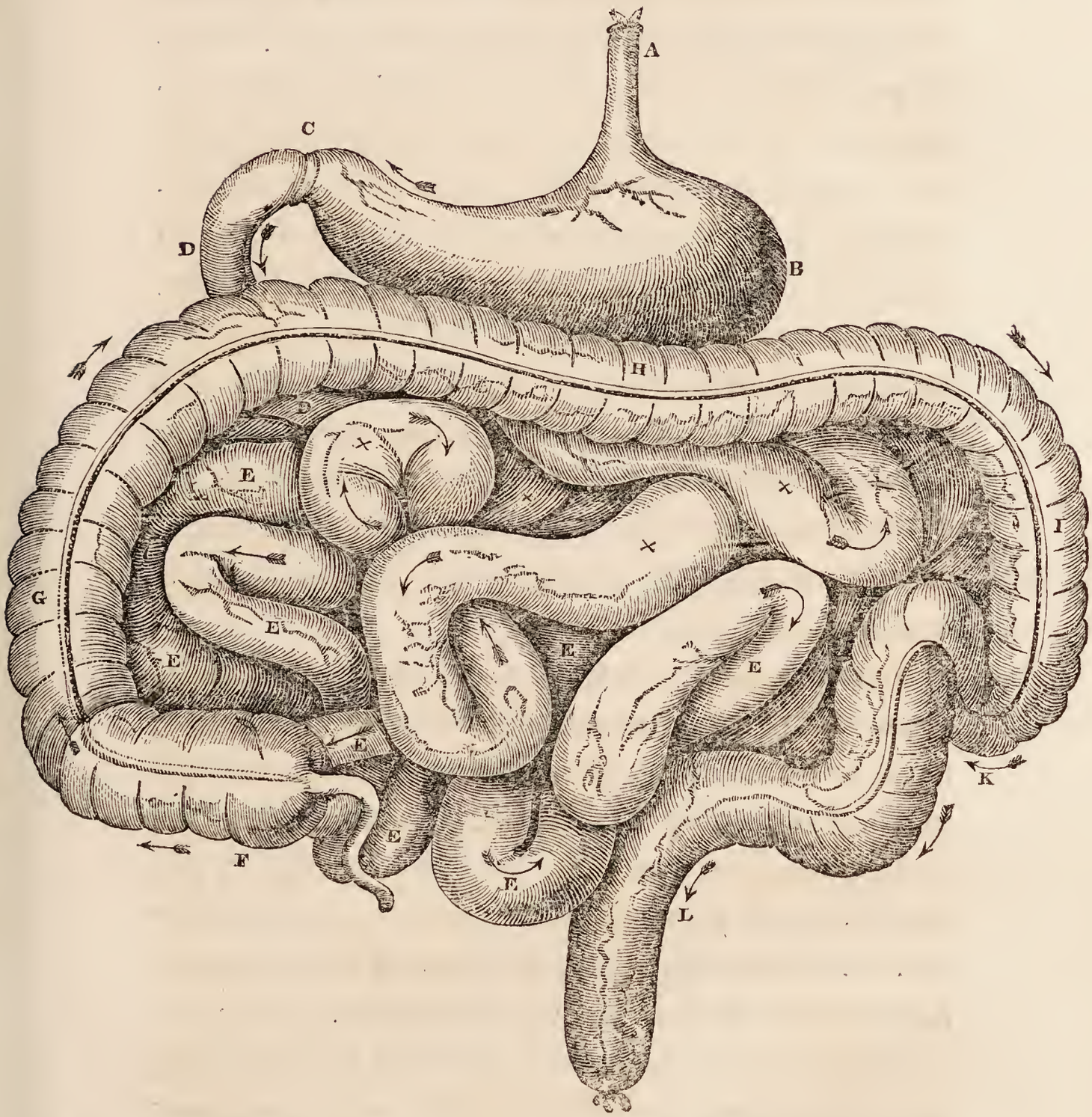
DIAGRAM

OF

THE APPEARANCE OF THE

STOMACH AND BOWELS,

WHEN FILLED WITH LIQUID.



A	The Œsophagus.	
B	The Stomach.	
C	The Pyloric end of the Stomach.	
D	The Duodenum.	Small Intestines.
×	The Jejunum.	
E	The Ileum.	
F	The Cæcum.	
G	The Colon; ascending Portion.	
H	.....	Transverse Arch.
I	.....	Descending Portion.
K	.....	Sigmoid Flexure.
L	The Rectum.	

The Stomach is an oblong bag, *large* at one end (B), and *small* at the other (C), having *two* openings, one *into* it from the Œsophagus (A), at the *left* side, and the other *from* it into the small Intestines at the Pylorus on the *right*. The bowels form a long tube, reaching from the stomach to the anus, and are called the small and large Intestines. The small bowels are denominated *Duodenum*, *Jejunum*, and *Ileum:* the large are divided into *Cæcum*, *Colon*, and *Rectum*.

Duodenum.—This part of the bowels emerges from the stomach, bends a little backwards and downwards (D), runs towards the *right* kidney, thence crosses the spine, turns a little forward and terminates in the Jejunum. The Duodenum, as its name imports, measures about *twelve fingers' breadth* in length.

Jejunum.—This intestine, which is a continuation of the former but more extended in length, makes several turns or convolutions, as marked in the Diagram by asterisks, and terminates in the

Ileum.—The convolutions of this portion of the small bowels surround the jejunum, as shewn by (E). It is considerably longer than the jejunum, and opens into the side of the cæcum.

The length of the small intestines is considered to be five or six times that of the body, or about thirty feet; nearly two-thirds of this length is denominated Ileum.

Cæcum, or first large bowel (F), is a short, broad bag, lying below the right kidney:

it is remarkable for the entrance into it of the ileum, where a valve is placed, to prevent the regurgitation of the contents of the large into the small intestines.

Colon.—This portion of the alimentary canal forms the greatest part of the large intestines. It arises from the cæcum, (of which it is a continuation,) a little above the groin; ascends perpendicularly (G), passing on the fore side of the right kidney. Taking its course under the liver, before the first turn of the duodenum, and along the front of the lower part of the stomach, it crosses the abdomen (H), from right to left, above the navel; then turns backwards, runs down on the fore side of the left kidney (I), and passing towards the spine, forms an extraordinary incurvation (K), called the sigmoid flexure of the colon. In this course the colon surrounds the small intestines, forming many attachments, and laying in extensive contact with neighbouring parts.

Rectum, continued from the colon, at the last bone of the spine, along the curve of the sacrum (L), and terminates at the anus.

In the preceding Diagram, no other portions of the abdominal viscera are shewn but the stomach and bowels; the alimentary canal being the only part essentially connected with the professed object of this publication. I am indebted to my friend Mr. Stratford, (an ingenious and accomplished young surgeon,) for the sketch of the

parts here represented, which was taken from the dead subject. Having first carefully removed the stomach and bowels *en masse*, we proceeded to inject water into the rectum, by means of Read's lavement syringe, thereby distending the whole course of the large bowels as far as where the ileum enters the cæcum. From the pressure of the injection, the gas contained in the colon, passed freely through the valve of the ileum, and considerably inflated the small intestines. The liquid, I have no doubt, would have passed also, if we had chosen to use any force. We next fixed the pipe into the œsophagus, and pumped a quantity of water into the stomach. The water entered the duodenum, but owing to the volume of gas contained in the small intestines, we found we could not urge much liquid into them, without incurring the risk of bursting some part of the canal. During this distended state of the bowels, the drawing was taken; and allowing some trifling transposition of a convolution here and there, for the sake of displaying the course of the canal, the representation is very correct. The rectum appears rather more on the left side, than it is in the living subject. The direction of the passage of the contents of the bowels is shewn by a flight of arrows.

Description of the Progress of the Food through the Alimentary Canal.—Food received into the stomach is dissolved in the gastric juices, and

by a sort of churning motion of this organ, is mixed and converted into a pulpy mass, called *chyme*. This process usually occupies from two to three hours, being more or less in various individuals, or as influenced by the nature and digestibility of the food. The *chyme,* protruded from the stomach into the duodenum, mixes with the bile, which is poured into this bowel by a duct from the liver, and with other juices, and is now called *chyle*. This fluid, as it passes through the small intestines, is absorbed by a number of small vessels whose bibulous orifices open on the inner surface of the canal, and is carried into the blood; the excrementitious part or refuse, urged through its course by the vermicular motion of the ileum, is deposited in that pouch or bag called the cæcum, where it accumulates, hardens, and acquires the fætor of excrement; this second process is usually completed in three hours more. The fæces next ascend from the bottom of the cæcum in a figured form, and pass through the colon, being moved onwards by the successive contractions of the cells or pouches of this intestine, until it reaches the rectum, where it excites a desire for its expulsion: this *last* stage of a complicated process is usually accomplished (or ought to be) within the space of twenty-four hours, from the time the food was received into the stomach.

Obstruction of the Bowels considered in its relation to the natural State of these Organs; and its Seat and Effects elucidated by References to the Diagram.

By a reference to the structure, function and condition of the intestines, most of the facts respecting the prevalence of constipation, recited in former pages, will cease to excite much surprise; we shall, therefore, now proceed to their consideration.

For the purpose of conferring on us some degree of control over the necessities of humanity, nature has endowed the lower bowels with less irritability than the upper; and the habit of suiting their exoneration to the conveniences and proprieties of social life, adds to their natural insusceptibility, and, of course, lessens the influence of stimulants upon them, giving rise to a retention of their contents beyond what may be indicated by the mere sensation occasioned by the quantity or bulk. That large accumulations in the intestines should often occur, will also less astonish us, if we examine the structure of the lower bowels. The rectum of the adult is equal to *three fingers* in breadth when empty, and capable of distension to more than twice that size: I have, indeed, seen it as big as a large

bladder. The colon is larger than the rectum in diameter, and from five to seven feet in length. Three strong muscular bands (one of which is shewn in the Diagram) pass along its whole course, and, by their contractions, draw the intestine into transverse folds, forming receptacles in it, called the cells of the colon. These cavities or hollows are in themselves, I conceive, sufficient to cause an occasional obstruction to the free passage of the bowel, and explain the inadequacy of purgative medicines to unload this intestine; for the fæces, which are entangled or tied up in these bags, allow the fluid secretions produced by cathartics to pass without being themselves dislodged. The peristaltic motion of the large bowels is likewise more slow than that of the upper; and the dryness of their contents increases in its gradual passage along the canal.*

Naturally then voluminous and unequal in structure; distensible by inherent property; slow

* Reckoning that the digestion, and expulsion of the refuse, of our food, takes place in twenty-four hours, Dr. Barclay calculated that allowing thirty-six feet for the length of the alimentary canal, the rate of motion would be about a foot and a half every hour, or an inch every three minutes. We can, however, by no means arrive at any mathematical certainty respecting the rate of progress of alimentary matters, from its being retained longer in the stomach of some individuals than of others, and even of the same person at different times. It is not probable, that, the contents of the bowels would become injuriously inspissated if they were not unduly retained, even though they might have been originally deficient in proper moisture.

in motion; possessing but little original sensibility and gradually losing even a portion of this from habit; with contents becoming more and more deprived of the moisture and consistence necessary for propulsion, we shall cease to be surprised at these bowels becoming frequently the seat of obstruction, or at their retaining a mass of fæces greatly exceeding the measure of our accustomed evacuations.

The cæcum appears to be more frequently even than the colon, the seat of obstruction and accumulation of fæcal matter, and this accounts for the pain and swelling at the lower part of the right side of the belly, that so often accompanies a loaded state of the bowels. It has been conjectured by some physiologists, that the cæcum performs somewhat the office of a second stomach; for we know that the alimentary matters discharged into it by the ileum, (see the Diagram) are detained in the cæcum, whilst some unknown process takes place. From the irritation of these matters, the cæcum becomes inflamed, and sometimes suppurates; it has, therefore, long been my practice, when constipation is combined with pain, tenderness and tumefaction at this part of the abdomen, to employ leeches very liberally in conjunction with injections, and this treatment is generally successful.

By a reference to the Sketch, it will readily be seen, how injurious an undue distension of the

colon must prove, by its mere pressure upon contiguous parts. Accumulations in its ascending portion, bearing on the right kidney, is a source of aggravation when this organ is diseased. Distension of its transverse arch, by its pressure upon the stomach, duodenum and liver, may be productive of nausea, interruption of digestion, and even temporary jaundice by its impeding the biliary ducts. I have witnessed bilious vomiting, attributable to the pressure of an overloaded colon upon the duodenum below the part where the common duct of the liver enters that intestine; or, at least, from the propulsion of bile into the stomach by the inverted action of the duodenum, occasioned by the influence of the enlarged colon, however effected. Distension of this part of the colon is sometimes mistaken for enlarged liver, but is easily contra-distinguished by careful examination; for the colon in its entire course around the small intestines, lays in immediate contact with the abdominal parietes, and may be at all times felt through its whole extent. The pressure of a loaded colon on the small intestines, as also its sympathetic relations with them, give rise to indigestion and other functional derangements. The right or ascending portion of the colon, is more frequently the seat of obstruction than the left; probably from its being rather smaller, and the course of its contents contrary to the law of gravity; colic, therefore, is much more frequent on the right than the left side.

Accumulation of fæces in the *rectum*, aggravates the sufferings from enlarged prostate gland, and from diseased bladder and uterus. It occasions also, even in otherwise healthy persons, various anomalous sensations in the surrounding parts, such as irritation in the urethra, anus, and prostate gland, and sometimes such an obstruction in the urinary passage as to assume the character of stricture.*

From these observations, it must be apparent that I have not overrated the importance of injections, for we may conceive the influence of this remedy when applied through an organ having such numerous and various connections as the colon; the necessity for unloading this torpid and large tract of intestine, from what has been stated, must be perfectly obvious. To persons afflicted with any of the diseases, influenced by the pressure or local irritation of the large intestines, and to females particularly, who in the last stage of pregnancy, cannot, but with great difficulty, bring the propulsive muscles sufficiently into action to expel the contents of the rectum, the use of lavements is paramount to every other consideration.

* I recollect attending a case, some years ago, where the fæces were so firmly impacted in the rectum that an injection could not be forced into it, until some portion of them had been scooped out with the handle of a spoon.

The actual Amount of the Alvine Evacuations daily and the Manner and Proportions in which the Excretions are derived from the Aliments, proved by Experiments.

Notwithstanding the familiarity that every person has with the natural evacuations, and an universal admission of the necessity for their due and regular discharge, there are few subjects of general information less known as to positive data than the exoneration of the alimentary canal. If the question were put as to the relative proportion between the quantity of food and that of the alvine evacuation, or of the usual and customary amount of the latter in any individual, I know not to whom I should look for an answer. I am, therefore, highly indebted to a scientific friend, for a detail (which the reader will find as an Appendix,) of a course of experiments, by which I am enabled to give distinct and positive information on this point. This valuable paper, which will be perused with peculiar pleasure by the scientific reader, contains an elaborate train of inductive reasoning upon *collateral* facts, of which, I regret, the limits of this work do not allow me to avail myself; I must, therefore, confine my remarks to such parts of my friend's experiments as relate to the immediate subject of this publication.

By referring to the Appendix, the reader will observe, that the quantity of food taken daily by the experimenter was thirty-five ounces, whilst the diurnal weight of the alvine evacuations was less than two ounces, or rather more than one-eighteenth part; I omit fractional divisions.

It will, no doubt, appear surprising, that the weight of the fæces should be so small when compared with the quantity of food, and an inquiry is rationally suggested as to the manner adopted by nature in disposing of the surplus aliment. The experimenter states, that forty-five ounces (about two pints and three quarters,) of liquid was drank daily, and forty ounces of urine discharged. There were also thirty-five ounces of water given off by breathing and perspiration, making with the urine seventy-five ounces, being *thirty ounces* of liquid discharged *more* than was taken. It was also calculated that eight ounces of carbon, passed off in vapour from the lungs, every twenty-four hours. Let us, therefore, make the calculation as follows. At the end of seven days the experimenter weighed thirty-five ounces less than at the beginning, being at the rate of five ounces waste *per diem*.* This loss must be calculated as food, which in reality it is, so much

* This is a curious fact, because we presume that he took his usual quantity of food, pursued his accustomed routine of employment, and preserved his general state of health during the interval: he makes no comment on the cause of this remarkable fact.

of the body being abstracted, to supply the excretions. I will now recapitulate.

Forty-five ounces of liquid taken; seventy-five ounces of liquid discharged; consequently, there were thirty ounces of the *latter* in excess.

The food weighed thirty-five ounces; the waste of the body five ounces, making forty ounces from which the above thirty ounces were drawn; leaving a surplus of ten ounces to be given off in some other form.

The above ten ounces were discharged as carbon and fæces; eight ounces of the former and two of the latter.

The conversion of solid matter into fluid at first appears startling; but, from the result of these experiments, the fact can hardly be doubted. The end and aim of the experimenter's labours are to shew the probability that there is a power in nature by which solid matter is first decomposed, and then their elements recombined in proportions, of which water is the result. But this singular process is not exerted, in the appropriation of food, to so great an extent as at first sight might appear; the term *solid* food not being applicable in a chemical sense. Our experimenter states, that the thirty-five ounces of solid food contained only fourteen ounces of anhydrous*

* Anhydrous is a Greek compound, signifying, without water; in a chemical sense, it means perfectly dry, or matter not in combination with moisture.

matter, the remaining twenty-one ounces being water, which was at once available to nature, for the supply of liquid excretions, by the simple process of absorption only; consequently, nine ounces more were required to make up the thirty ounces above stated; and these nine ounces were produced by a peculiar physiological conversion of solids into fluids.

By an application of these facts to the subject of constipation, the influence of irregularity or excesses in diet, in inducing the disease, will be apparent. As long as the digestive organs have the power to assimilate the food taken into the stomach, no accumulation or congestion takes place in the system, because nature is enabled to convert the recently animalised products into new combination suited for expulsion through various outlets, of which the lungs and skin, (as shewn by the experiments hereafter detailed) are the principal. But if a larger quantity of food be taken than can be digested and carried into the blood vessels, and the bowels be debilitated or torpid, the consequence must be that the surplus will not be properly expelled, and accumulation must inevitably ensue.

Of the Manner in which the Alvine Evacuations are modified by the Aliments.

The result of the experiments, briefly recapitulated in the foregoing chapter, shews, that the weight of the alvine evacuations daily was about two ounces; but, it must be granted, that nature is influenced by no fixed laws in this respect; the quality, appearance, and bulk of the fæces, being contingent upon the varying circumstances of season and temperature, exercise and rest, quantity and digestibility of food, constitution and age. In the summer season the motions are softer, and in the winter harder. By exercise, their consistence and bulk are diminished, whilst rest has an opposite tendency.* The amount of all the excretions is, no doubt, increased or diminished proportionally to the quantity of food, and the alvine evacuations of course in the same ratio with the rest; and a similar effect ensues from the greater or less nutritive properties of the various aliments. Persons of weak constitutions, or those who are dyspeptic, digest a less quantity of their food; and, consequently, the evacuations

* These effects must not be confounded with the causes of constipation, for, although exercise may contribute to the hardening of the fæces, it unquestionably tends to their expulsion.

by stool are greater. The digestive function of young persons is known to be better and more completely performed than that of the aged; and, therefore, in youth, less matter remains to be rejected than in old age.

In forming a judgment, therefore, upon the proper and sufficient action of the bowels, (whether from inspection or by the balance,) several circumstances must be taken into consideration. It would be preposterous to expect that the same quantity of alvine discharge should succeed equally a feast or a fast, or that a person's motions, who lives upon twelve or fourteen ounces of food daily, (and many in perfect health eat no more,) should be as voluminous as those of another, who devours four times that quantity, which is still more frequent.* The same indi-

* The experiments in our Appendix, shew that the excretions of the skin and of the lungs are derived from the aliments, and, therefore, it does not follow that the evacuations from the bowels shall at all times correspond with the quantity of food taken, the living body having the power of relieving the system through the former emunctories, as well as the latter; the case of the notorious Tarrare is an example of this kind.

Tarrare, when a boy, once eat a large basket of apples, and at another time swallowed a quantity of flints and corks. Frequent fits of colic obliged him to seek admission into an hospital, where he was detected just in time to prevent his swallowing the surgeon's watch, chain and seals. "Before his enlistment," says Dr. Mason Good, "he was in the habit of devouring enormous quantities of the coarsest flesh, fruits and roots; and, subsequently, he was found, after swallowing his own rations, to feed on the refuse of his comrades' messes, or

vidual also, though he ate regularly the same weight of food, and the bowels acted with their usual healthy efficiency, would find a difference in the relative proportions of the ingesta and the fæces, accordingly as the quantity of vegetable or animal aliment had preponderated; or, as

offensive meat thrown on the dunghills; and to devour cats, dogs, and serpents. M. Fournier tells us, that at seventeen years, when he weighed only one hundred pounds, he could devour in the space of twenty-four hours a quarter of beef, as heavy as his body: and that on one occasion, when in the army, he devoured in a few minutes a dinner prepared for fifteen German labourers, and composed of various substantial dishes. There is a singular story, that the French commander attempted to turn this wonderful voracity and extent of stomach to a good account, by employing it as a safe deposit for a letter of secresy, which he wished to send to a French officer, at that time in the hands of the enemy. He sent for the man, shewed him a wooden case containing the letter, and having put him into good humour, by treating him with thirty pounds of liver and lights, prevailed upon him to swallow it, and to depart with all speed to the enemy's quarters. Tarrare, however, was taken prisoner in the attempt; and, while in prison, passed the box by stool, before he could meet with the officer, but immediately swallowed it again, to prevent it from falling into the enemy's hands. He was strongly suspected of cannibalism, and was often restrained, with difficulty, from the ward appropriated to the dead. He, at length, fled from the army, before a rumour of having devoured a child of sixteen months old, which had suddenly disappeared. The alvine evacuations of this man were not immoderate; but, after gorging his stomach, he slept and *sweated in torrents of perspiration.*" Pouteau mentions the case of a young lady who had no stool for upwards of eight years, although during the last year she ate abundantly of fruit, and drank coffee, milk and tea, and broths, with yolks of eggs; but she had *copious greasy sweats.*

certain selections might have been made from either of these two classes of food: that is, in the former case, whether he had dined on a pouud of meat with half a pound of vegetables, or on a pound of vegetables with half a pound of meat; and, in the latter instance, whether he had eaten of venison or bacon, and of potatoes or cabbage. In the first example, the bulk of fæces would be determined by the quantity of nutritive matter contained in the food; (which would be more or less as the animal or vegetable portion was in excess,) and, in the second, by the degree of digestibility of the kind selected, venison being more digestible than bacon, and cabbage less so than potatoes. But the quantity of the alvine evacuations is also considerably influenced by incidental causes; 1st, By the respective qualities of *different* portions of *the same* article of food, such as fat and lean; the *former* being so entirely composed of nutritive principles as to *leave no refuse* if the digestive organs be in a state of health and vigour.* 2ndly, By the wild or domestic state of the animal, or by its having been recently killed or otherwise. 3rdly, By the meat being fresh or salted, and by the manner of its culinary preparation. But all these various conditions, whether primary or secondary, are exceedingly influenced, as I observed before,

* One ounce of fat is equal to four ounces of lean meat.

by the *quantity* of our food, and the strength of the digestive apparatus. An undue quantity of the most nutritive food will leave a considerable mass of undigested matter, which nature refuses when aliment is forced upon her in excess; and in dyspeptic disorders, the effects of over-feeding are apparent, either in the frequency or volume of the motions, or in distressing distension and disturbance resulting from constipation.

The colour and appearance of the fæces are signs also, denoting the healthy state of the viscera, as well as various accidental influences. Hippocrates remarks, "that the best stools are soft, close, of a dark yellowish colour, not very fetid, and discharged at an usual time or hour, *in a quantity proportioned to the food taken in.* For when the stools are thus conditioned, the abdomen or lower belly is in a healthy state." This is as good a description as can be given of healthy motions; but there are other appearances which they assume, under various circumstances. Dr. Paris, in his Treatise on Diet, remarks, that the air changes the colour of the stools, particularly those of infants, which soon turn from yellow to green, by mere exposure; that certain vegetables impart a green hue, and beet root its colour, to the fæces; that persons who take a considerable quantity of milk will pass pale coloured evacuations, and that cheese is apt to be discharged in an undigested state. The

author of a recent medical publication* states, that "aloetic medicines produce dark, slimy, and very offensive motions. Senna generally produces very dark motions, which emit a cadaverous odour, often attended with a considerable escape of hydrogen. Rhubarb occasions motions of the yellow colour, which Mr. Abernethy says, indicates a healthy state of the liver; but may it not be attributed to its interrupting the processes of chymification and chylification, and checking the fæcal secretion of the colon? Almost every aperient medicine, probably, produces motions either of different appearance or odour. The effects of steel, in rendering the fæces black, is well known." The learned editor of the Medico-Chirurgical Review, thus expresses himself with regard to the alvine discharges. "Doubtless the colour of them is occasionally indicative of morbid conditions, yet the discoloration is often produced by various aliments, fluids, and medicines; and if this fact be overlooked, incorrect opinions may be formed, and improper treatment recommended. Port wine and claret will make the stools of a black appearance in those unaccustomed to their use; and so will bottled London porter, unquestionably, from the intermixture of certain noxious ingredients. Again, the fine yel-

* "A Practical Dissertation on the Means of obviating and treating the Varieties of Costiveness, &c. &c." By Richard Reece, M. D.

low colour of the evacuations, believed to arise from the exhibition of the blue pill, or calomel, can be generated by eating dried French plums or prunes."

The specific gravity of fæces, is a tolerable indication either of the state of the digestive organs or of the nutritive qualities of food. Healthy motions are observed to float in water, which I attribute to the complete division of the texture of the food in the process of digestion, and its subsequent commixture with air; but if the alimentary substances be composed of materials not properly soluble in the gastric juices, a portion of their fabrick passes through the bowels without being reduced, possessing sufficient gravity from its density to cause it to sink in water. This takes place with spinach, pork, fish, &c.

It is often observed, in cases of irregularity of the bowels, that dark coloured and dry fæces are mixed with newly formed portions: this is a certain indication of their retention in the rectum, and of the necessity of expediting and assisting their expulsion by the use of lavements.

ANALYSIS OF FÆCES BY BERZELIUS.

Water	73,0
Vegetable and animal remains	7,0
Bile	0,9
Albumen	0,9
Peculiar and extractive matter	2,7
Salts	1,2
Slimy matter, &c.	14,0
	100,0

Fæces, when dried, lose $\frac{75}{100}$ of their weight: they are not soluble in, nor do they readily mix with water, but by agitation and maceration they may be diffused through it. It is more than probable, that the alvine excretions *do not*, as is commonly imagined, *consist of the mere refuse of the aliment;* for evacuations are produced under a state of abstinence or even of actual deprivation of food. Mr. Hallam delivered a female of a child who had no passage into its stomach, and, consequently, received no food during the thirteen days of its life; but, notwithstanding, it passed one or two evacuations daily, not distinguishable in quantity, colour, or consistence, from the stools of children who take food in the usual manner. In fevers and other diseases, where no food is taken, and sometimes, as I frequently observe in children, not even so much as a glass of water daily, solid evacuations are either passed spontaneously, or may be dislodged by aperients or clysters. This is only to be explained, by presuming that the colon itself is an organ of depuration, and by its secretive powers carries off effete matter, which, in conjunction with bile, mucus, &c. is discharged, either with or without the fæculent remains of the food. Pechlin ascertained, by including a portion of intestine between ligatures, that a very considerable quantity of fluid was poured into the small intestines, which, having accomplished its office connected with the function of the bowels, conti-

nues to be absorbed in its passage through the canal. Haller estimated the quantity of this fluid as eight pounds daily; but as Dr. Elliotson has remarked, this statement is exaggerated.

The conclusion to be drawn from these facts is, that, notwithstanding the volume of fæces is not always in an exact or fixed proportion to the quantity of food taken, yet, in general, the one determines the other so nearly, as almost to establish a general rule, to which, of course, there will be occasional exceptions. The rule may be taken from the result of the experiments detailed in the Appendix, viz. that a pound of food produces rather less than an ounce of fæces; this will be at least an approximation to the fact, and when qualified by the various circumstances which have in this chapter passed under our notice, will enable us most commonly to come to a conclusion not very remote from truth.

At all times when it is desirable to acquire a knowledge of the state or sufficiency of the alvine evacuations, the *quantity* or actual bulk must be ascertained by examination, as no reliance can be placed on the *frequency* of the discharge, nor on the sensations produced by their expulsion, which are exceedingly apt to deceive us. The eye may be soon practised in the art of determining the quantity and quality of this evacuation, and much benefit result from the acquisition and application of such a tact.

On the Regulations of Diet, necessary in obviating Constipation, and giving Efficacy to Means adopted for its Removal.

So many books have been written on *Dietetics*, that it might be considered as a work of supererogation, were I to enter at much length upon the subject; but this I have no intention of doing, not only on the score of inexpediency, but that it would be foreign to the design of my original undertaking. The direct object, however, of this work, being the preservation of a regular and proper action of the bowels, so as to prevent, as well as remove the occurrence of constipation, I should consider my plan incomplete, if I neglected to shew the influence of diet in counteracting, or contributing to these desirable ends: I shall, therefore, proceed with a brief sketch of the general qualities of alimentary substances, a knowledge of which is indispensably necessary in conferring efficacy upon any method adopted for the accomplishment of the object in view.

What is meant by the terms DIGESTIBLE *and* NUTRITIVE, *should first be clearly understood.* These two qualities are generally confounded with each other, or regarded as one and the same; whereas, they are not only perfectly *distinct*, but they are principles commonly *opposed* to each other, in

relation to the action of the digestive organs upon substances taken for the sustenance of life.

A substance is said to be *digestible,* that admits of being readily dissolved by the juices of the stomach and easily elaborated into a state and consistence, necessary and proper for its reception into those vessels which absorb and carry it into the blood. It is said to be *in*digestible when these changes are effected imperfectly, or with much difficulty.

A substance is denominated *nutritive,* when it is known to contain abundantly, or be composed of those forms and combinations of matter, which are similar to the structure and composition of the human body itself; and which are, consequently, chemically adapted, to furnish ample materials for repairing the waste of the system. It is denominated *in*nutritious, when its bulk is made up chiefly, or in a considerable proportion, of such a fabrick as produces scanty materials for the formation of blood.*

* Some years ago an American Indian was shot by a musket in the abdomen, the ball penetrating the stomach. As the wound did not afterwards heal, an opening was left, through which, substances were easily introduced into the stomach, and many experiments were made upon the man's digestive function. The surgeon who attended him thus narrates the particulars of these experiments.

" Experiment 1.—On the 1st of August, at 12 o'clock in the day, we introduced into San Martin's stomach, the following substances, made fast by threads: viz. a piece of alamode beef strongly spiced—a piece of raw corned beef—a piece of

Man is omniverous, and draws his supply of food both from the animal and vegetable king-

fat bacon—a piece of fresh raw beef—ditto boiled—a pieee of bread—a pieee of raw cabbage stalk. Each article weighed about two draehms. After they were introduced into the stomach, San Martin continued his domestic occupations, as usual, within doors. In one hour after the introduction of the above materials, they proceeded to examine them. The *cabbage stalk* and the *bread* were about half digested—the *animal food* had undergone *no* sensible change. All the articles were forthwith returned into the stomach. At the end of two hours, the cabbage, brcad, and bacon were entirely digested—the other aliments were little altered. At the expiration of three hours, the alamode beef was partly digested—the raw and corned beef was a little macerated on the surface, but its texture was nearly entire."

The man was exceedingly ill after this experiment, which shews how the digestive process may be disturbed by a heterogeneous mixture of food. The corned beef was not digested after a lapse of three hours, and yet, as will appear by the 3rd Experiment, the man's stomach was capable of digesting the same kind of food in two hours, when the organ was not oppressed or teazed by an injudicious mixture of aliments. The effects of this experiment must not therefore be received as evidence of the degree of digestibility of the various articles used, but rather as proofs of deranged condition of the stomach.—AUTHOR.

"EXPERIMENT 2.—On the 7th of August, at 11 o'clock in the forenoon, the tube of a thermometer was introduced into the stomach. In five minutes the mercury stood at 100° of Fah. and continued at that standard. By means of a gum-elastic syphon, one ounce of clear gastric juice was drawn off into a phial capable of holding three ounces. A small piece of *boiled beef* was immersed in the fluid. The bottle was well corked, and placed in a temperature of 100°. In about forty minutes the digestion had evidently commenced on the surface of the meat. At fifty minutes the fluid in the phial became

dom, and in the order thus set down, these two great divisions may be classed in respect to their quantity of nutritive principles. At the head of the first class, *venison* perhaps claims its place, to which succeed, beef, mutton, game, pork, veal, lamb, chicken, fish.—In the vegetable world, the principle of nutrition observes the following order; wheat, barley, oats, peas, beans, rice, rye, potatoes, carrots, parsnips, turnips, beet root, green vegetables (as cabbage, spinach, &c.) and lastly fruits.

opake and cloudy. The fibres of the meat began to be disengaged, and in one hour chyme seemed to be forming. At one p. m. the muscular fibres had diminished one half. At five o'clock, very few remained—and at seven there was scarcely any visible trace of muscle. At nine the whole substance was completely dissolved."

"EXPERIMENT 3.—On the same day, and at the same hour, a piece of meat, exactly the same size and kind as that placed in the phial, was introduced into the stomach, with a thread attached to it. At the end of one hour it presented nearly the same appearance as the piece in the bottle. At one o'clock the thread came away, the meat appearing to have been entirely dissolved. The process in each case was the same for the first hour; but afterwards the meat was much more quickly digested in the stomach than in the phial."

"EXPERIMENT 4.—On the 8th of August, at 9 o'clock in the morning, an ounce and a half of gastric juice was obtained and put into a phial. Two pieces of *boiled chicken* were suspended in the fluid by threads, and the bottle was placed in the temperature above mentioned. A vigilant watch was kept on the whole. The digestion followed the same phases as in the 2nd Experiment, except that it was more slow. The chicken being a denser meat than the beef, the gastric juice could not insinuate itself so readily among its fibres. In other respects the processes were precisely the same."

The above scale of nutrimental value affords no information as to the digestibility of each article respectively, the former being frequently in an inverse ratio to the latter; thus, jellies which are composed entirely of the nutritious particles of animal fibre, and contain more nutrimental matter than food of any description or kind of an equal bulk, are less digestible than fruit even, which contains the least.*

The principles of nutrition are fixed by nature; the degree of digestibility is qualified by causes various in different individuals, and ever changing in all; hence the stomach of a dyspeptic or an invalid shall be disturbed by a slice of the most tender mutton, whilst the ploughman fills his stomach with hard salt bacon, unconscious, except by the removal of hunger, that he has put any thing into it.† The art of cookery also dis-

* During a siege at Middleburgh in Zealand, "they lived on bread cakes made of lin-seed; the hypochondria were very soon hereby distended, the face and other parts became swollen, insomuch that many died of the distemper." *Diodonæi Stirp. Histor.* pag. 335. In this case the lin-seed jelly was too tenacious to be digested.

† "Nothing so foreign but the athletic hind
"Can labour into blood. The hungry meal
"Alone he fears, or aliment too thin,
"By violent powers too easily subdued,
"Too soon expelled. His daily labour thaws
"To friendly chyle, the most rebellious mass
"That salt can harden, or the smoke of years;
"Nor does his gorge the luscious bacon rue."

ARMSTRONG.

turbs the original qualities of some substances, and, like the magic wand of Harlequin, compels its agents to change places and features, and this distinguishes the alimentary character of roasted and boiled meats; the former being most nutritious, and the latter most digestible.*

Highly nutritive properties do not confer digestibility upon aliment, but rather tend to an opposite effect; indeed, a dense concentration of nutrimental matter almost entirely precludes its

* A gentleman in the country who consulted me for a stomach complaint, and to whom I sent some dietetic axioms, writes to me as follows:—"I do not quite comprehend how boiled meat, which you say is less nutritive than roasted, can be more digestible; because whatever lessens the nutrition of food, increases, of course, its indigestibility." My reply was, that although a portion of the nutritious particles of meat be abstracted in the process of boiling, so that it afterwards contains a smaller quantity than the same bulk of roasted meat, yet a weak stomach would digest a larger quantity of the former than of the latter, in consequence of the softened state of the whole mass, and, therefore, if four ounces of boiled meat are deprived of one ounce of its nutritive parts by this process, but leave three ounces of matter easily soluble in the stomach, an individual will receive from it more nutriment than from four ounces of roasted meat, which from its concentrated texture and qualities, may be so rebellious against the stomach, as to yield but half its bulk to the process of digestion. But in these cases, it is not so much the loss of nutriment that the patient has to complain of, as the uneasiness occasioned by the long retention in the stomach of food difficult of digestion, as this organ allows no substances to pass until they have succumbed to its discipline, if within its power to accomplish it.

digestion in stomachs not of the most robust order, as was instanced by animal jellies. The tone of the stomach, state of the general health, peculiarity of constitution, and the age and sex of every individual, determine the active power of the digestive organs; whilst the kind, combination, artificial preparation, and quantity of food taken, control and establish its effects. These circumstances are so varying that no dietetic rule can be brought to apply to all persons, therefore, as the learned Van Swieten exclaims, "No food is to be called wholesome in general, and he that should ask what food is most so, might as well enquire what was the best wind, without saying whither he was bound."

Important as the administration of intestinal injections may be in the correction of constipation, it must be evident to the reader, that a due knowledge and regulation of diet are equally so, and that without the corrective influence of the latter we incur a much greater risk of requiring the assistance of the former. Need I attempt, in explanation of the preceding views, to prove that such kinds of food as elude digestion and leave a considerable refuse, have a tendency to costiveness and aggravate its effects; and is it necessary I should advise persons disposed to this state, to choose a laxative diet rather than a con-

trary one? No; enough has already been said, and I shall, therefore, pass at once to its practical application.

In selecting such food as will, probably, least burden the bowels with refuse, too much stress must not be laid upon the scale in which alimentary matters are placed in page 67; because, as I have before stated, the most nutritious is not always the most digestible food. That kind should be chosen which approximates in its principles to the object in view, combined with such other articles as are sanctioned by a knowledge of their leading character and our individual experience of their united effects. A combination of food of various qualities is certainly necessary to the health of the digestive organs and the system at large, which cannot be preserved by a sole adherence to that kind of food in which nutriment exists either too abundantly or sparingly. Hence we mix vegetable with our animal food, and with much propriety; the bare and scanty nutritive body of the former being filled up or augmented, as it were, by the excess or superfluity of the latter.

As regards the necessary commixture of vegetable with animal food, and also the effect of aliment in respect to constipation of the bowels, there is no article of diet equal in importance with *Bread*. Universal consent attributes to this great and prevailing article of food considerable

influence on health and strength, and very serious complaints are raised against the present mode of preparing it, by which it is considered that its nutrition is lessened and noxious properties communicated. Without entering into the question whether alum or any other substances be mixed with bakers' bread, I have no hesitation in asserting, that *fine* bread tends to produce costiveness, and I believe that the great prevalence of this disorder might be lessened by recurring to the good old fashioned *Brown loaf*. It is unnecessary I should explain how, finely or coarsely dressed flour influences the bowels farther than this, that white flour contains the *starch* of the wheat without the *bran*, and it is well known that starch is astringent, and bran laxative. The Romans made their bread of the ground corn, just as it comes from the mill, which they called *Syncomiston;* i. e. unsifted; or *Panis Furfuraceous*. The ancients entertained an opinion that bread was most wholesome and nourishing when made of flour retaining the *whole* of the bran contained in the wheat, and that it became less so, in proportion as the flour was made finer by dressing and sifting: Hence, the Greek wrestlers used no other bread than that made with the coarse unsifted flour, and this they conceived was so nourishing and strengthening, that they called a brown loaf *Coliphium*, which imports strength of limb. It would be well

then, if those persons who suffer from irregularity of bowels, made use of this kind of bread only, and indeed I might add, to the almost entire exclusion of vegetables: It is decidedly the best *diluter* (I may be pardoned the application of the term in this sense) for the more concentrated and higher animalised kinds of diet, and by its commixture with it, gives, as I am well assured, a solubility to dense animal food, whilst at the same time by its gently aperient quality it stimulates the bowels and prevents accumulation of their contents. Rye flour is considered more aperient than the former, and some persons make bread composed of three-fourths wheat and one-fourth rye flour, but I should give the preference to unsifted wheat flour alone. In point of nutrition also, the brown loaf has a decided advantage; fine flour contains the gluten of the corn in too concentrated a state to be easily digested; and this objection is valid against arrow root, sago, and other vegetable jellies. Fine bread is certainly improper for children, it renders them costive, and frequently passes through the bowels half digested.

I have dwelt thus long upon the subject of bread, not only because it is the most necessary and wholesome of vegetable food, but from its being in more general use; my limits, therefore, necessarily oblige me to be brief with the remainder of the subject.

Carrots, turnips, and radishes are slightly laxative, but very innutritious, leaving a large quantity of undigested refuse.—Green vegetables and young potatoes, as well as those which are called waxy, are likewise indigestible; potatoes should be roasted. Rice, sago, tapioca, and arrow root are liable to the objections before stated. Oranges, strawberries, and raspberries are laxative. Barley water, gruel, (especially with butter,) and whey are slightly laxative. Milk is most digestible after it is boiled, and when mixed with gruel is aperient also. Raw eggs are indigestible but laxative; cooked eggs the contrary. Apples are indigestible, except boiled or baked, when they are very wholesome and laxative.

A combination of animal and vegetable matter is essentially necessary in our aliment, and the latter should largely predominate. In proportion as the different articles of animal food are composed of the more dense and nutritive particles as represented in the list given in page 67, so ought the quantity and quality of vegetables taken with them to correspond. Insufficient mastication is so frequent a cause of indigestion, intestinal disturbance and constipation, that attention to this point cannot be too strongly insisted on. But above all, and paramount to every other precept and rule, is *temperance*, and though I would not actually enforce the dogmas

of *Cornaro,* and prohibit more than twelve ounces of food daily, yet, I would say, that those who preserve the closest approach to such a standard, will incur less risk of the evils arising from irregular and obstructed bowels, than those who indulge more liberally in the gratification of appetite, and who must pay the penalty which nature imposes upon the transgression. Abstinence is still more peremptorily necessary to the literary and sedentary, and should be ever kept in view by every person, whose habits or avocations are of an intellectual or passive character.*

* Since correcting the 'proofs' of the preceding pages, an admirable and elegant work has fallen into my hands, from the pen of an accomplished writer, Dr. Shirley Palmer, of Tamworth; and, notwithstanding the inconvenience attending the cancelling of the pages of the work, already in an advanced stage, I am induced to make room for the introduction of the author's remarks upon exercise and abstinence, entitled, as they richly are, to serious attention; and corresponding, as they do exactly, with my own opinions. "The energy of the bowels," he observes, "is impaired, and their functions rendered torpid by the defect of muscular exertion. Hence, the chronic diseases and habitual constipation of sedentary females. Hence, the intestinal affections which, induced by the united influence of rigorous confinement and severe intellectual labour, too often cloud the prospects, or shorten the existence of literary and scientific men." Our talented author farther says, "Whenever, therefore, an individual is inevitably destined to a sedentary or inactive life, he should, in accordance with the principles which nature and experience alike prescribe, cautiously regulate the measure and quality of his food by the diminished wants of his system and the peculiar circumstances of his situation."—Popular Illustrations of Medicine.

Hints to direct the Judgment in selecting A Laxative Diet.

Make choice of such kinds of food as leave the least refuse.

Avoid aliments that are indigestible, as pork, geese, ducks, fish, dried provisions, cheese, jellies, pastry, mealy potatoes, *fine* bread, green and raw vegetables, salads, stone fruits, melons, skin of grapes and gooseberries, all kinds of nuts and spices.

Whey may be taken liberally, and barley water as the common drink at meals, except when sweet-wort can be procured. Oranges are laxative, but the skin and pulp should be rejected.

Animal food rendered soft and tender by slow boiling (but not over-done) is preferable even to roasted, except the digestive powers are strong. Broiled meat should have the outside pared off, and when fried ought to be rejected.

Oatmeal gruel is laxative, and is very proper both for breakfast and supper; if it does not disagree with the stomach, a piece of butter should be added, as it increases its aperient qualities. Or, equal parts of boiled milk and gruel. Likewise, baked or boiled fruits, as apples, rhubarb, mulberries, currants, strawberries, raspberries, are laxative: they should be eaten with

coarse bread. Also, honey spread on bread and butter. Veal broth is laxative, and if a little thickened with oatmeal or groats is very nutritive: It may be also boiled with vegetables and bread, enough of which will be dissolved to render the strained liquid very wholesome and nutrimental. Decoctions of animal and vegetable substances of this kind suffer all their solid contents to be digested, and leave no refuse.

Oysters eaten for supper, tend to open the bowels on the following morning.

Directions for using Intestinal Injections, with Rules for regulating their Application, and promoting their Effects.

1st. *For Domestic Lavements,* Warm Water *only is necessary.*

To remove costiveness merely, whether habitual or occasional, the object is to break down the collected excrements by the immission of a fluid, which at the same time stimulates the rectum, and becomes a vehicle for the discharge of the fæces. Soapy water lubri-

cates the inner surface of the bowels, softens and mixes with their contents, and causes them to slide with more facility: it may be easily prepared, by dissolving a table-spoonful of soft soap in a pint of warm water. Honey is also used in the same manner. Water gruel, lin-seed tea, and other mucilaginous fluids, probably facilitate the passage of the fæces, by rendering the surfaces more slippery. Where it can be ascertained that the motions are retained in the rectum by habitual dryness of this bowel, a decoction of marshmallow roots may be injected in preference to water, as it attaches itself by its viscosity to the mucous membrane of the rectum, and supplies the place of the defective secretion. Lin-seed oil made warm, produces the same effect. Olive oil, castor oil, treacle, sugar, and other substances may be mixed with water to form lavements, as they are supposed to expedite the effect; but for common and domestic application, these various preparations have no advantage over water only, which can be at all times and places procured with facility and dispatch.

2nd. *The* TEMPERATURE *of Injections should be about* 100°.

The internal heat of the body in health is from ninety-eight to a hundred degrees by

Fahrenheit's thermometer, and the temperature of a lavement should on common occasions correspond with it. An injection excites pain if thrown up too warm, and it will be more quickly expelled; indeed, there are few persons who, at the first application of the remedy, can retain many ounces of liquid even at the same temperature as the blood; but habit at length enables them to sustain a much greater heat. In cases of obstinate constipation or obstruction of the bowels, the torpidity of the canal may be removed, by rousing its nervous and muscular activity by the stimulus of heat, and here the temperature of injections may be raised to 110°; but, on general occasions, as it is exceedingly desirable the lavement should be borne in sufficient quantity and retained long enough to make a proper impression upon the canal and its contents, the warmth of the injection should be no more than can be comfortably sustained. The *back* of the hand, in the absence of a thermometer, is a tolerable test of the necessary temperature; the liquid should only convey an agreeable warmth to the hand, and if it produces a more vivid sensation, it should be allowed to cool farther; a little experience soon makes the hand expert in this tact, but still a thermometer is the best and most certain criterion.*

* Some practitioners object to *warm* clysters in cases of piles, and advise *cold* water to be used in the quantity of a pint

3rd. *From One Pint to Three is the* QUANTITY *of Liquid necessary for an ordinary Enema.*

A great defect in the use of injections arises from an erroneous notion respecting the quantity that ought to be administered: It is generally considered that half a pint is sufficient, and a pint is regarded as a maximum. Such quantities, it is true, may *sometimes*, produce the desired effect; for it is a curious fact, that the presence of liquid powerfully stimulates the extremity of the rectum, as is experienced by the urgent desire to stool whenever liquid

or more. I allow that the immission of cold water is succeeded by a grateful sensation of relief, but I do not think the practice is quite safe, particularly to full and plethoric persons, in whom, determination of blood to the head (a very probable result from cold applied to the viscera) might be productive of bad consequences. But there is less objection in these cases to the French mode of applying cold water, which is by a jet or stream directed *against* the anus; (not *within* it) they call it the "*douche ascendante.*" Where piles exist, great pain is excited by the passage of every motion, and a considerable irritation left in the part for some time afterwards. The douche ascendante is here a valuable application, and should be used at the time of going to stool. It relieves also those exquisitely distressing sensations which hæmorrhoidal subjects endure from a morbid state of the nervous structure of the parts about the anus. The water may be thrown against the anus with a lavement apparatus, by holding the pipe two or three inches from it. I cannot, however, acquiesce in the propriety of *copious* cold lavements, having in some instances understood that they had produced colic.—I shall revert to this subject hereafter.

fæces descend into this portion of the canal: the presence of the smallest quantity excites an urgent conatus ejiciendi, exceedingly painful and difficult to restrain. But in that state of the bowels usually connected with a costive habit, an equal irritation does not usually succeed the immission of a very small quantity of liquid; nor is an excitement conveyed sufficiently powerfully or remotely through the alimentary tube to stimulate it to urge forwards its more distant contents. Habitually torpid bowels require something more than the stimulus of the mere contact of the injection with the rectum; the liquid must be carried into the colon itself; softening and dislodging whatever collected fæces may oppose its passage;—stimulating by its fluidity and temperature;—distending by its bulk the whole course of this bowel;—and exciting its action beyond that portion to which, it may be supposed, the injection itself penetrates. How far it is reasonable, in all cases, to expect this effect from the immission of half a pint or a pint of liquid, will appear by comparing it with the calibre and extent of the lower bowels. To ascertain what quantity of liquid the large intestines were capable of containing, I lately tried the experiment upon the dead body. The subject was a female of small size and stature, but the rectum, colon and cæcum readily admitted *seven-*

teen pints of water, though I did not distend them by any means forcibly.

Immense accumulations of fæces will sometimes take place in the colon, with vast collections of gas accompanied by spasmodic constriction of the canal; giving rise to violent obstruction and colic, and requiring mechanical dilatation of the bowels for its removal. This can only be accomplished by the immission of a very large quantity of liquid, sufficient to counteract the spasmodic contractions of the colon and by distending the bowel to a more uniform calibre, open a free and uninterrupted canal for the passage of its confined and impacted contents. The *warmth* of the injection, of course, contributes to a relaxation of the spasm; but, notwithstanding, it has required, in many instances, the immission of more than TWO GALLONS of liquid to remove the obstruction.* Mr. Taunton has

* On the subject of the Stomach Pump there are some remarks made by the learned and philosophical author of "The Elements of Physics," that I cannot refrain from giving verbatim. "Useful as the pump may prove, upon occasions, in evacuating the stomach, its more ancient office of injecting the enema is still the most important; and recent experience seems to shew, that such injection may become a remedy of more extensive utility than had yet been suspected. From an erroneous opinion, that what has been called the valve of the cæcum acts as a perfect valve, allowing passage *downwards* only, few practitioners have ventured to order much liquid to be injected, for fear of over-stretching or bursting the lower

in his possession the colon of a female, increased by habitual costiveness to twenty inches in circumference: it contained three gallons of fæces!

When it is intended that an injection should

part of the intestine; and the possibility of relieving disease *above* the supposed valve has scarcely been contemplated. It is now ascertained, however, that fluid may be safely injected, even until it reach the stomach. *Perhaps few, if any cases of obstruction of the bowels, could resist the gentle force of penetrating water,* and if so, a mechanical remedy of certain effect may, in many cases, be substituted for the drastic purgatives and pernicious bleedings now used, and often used in vain. From what has been said above of the abdomen and the intestinal canal, it appears that an injection tends to spread itself with singular uniformity over the whole. This tendency may be rendered obvious to sight, by throwing a sheep's intestine recently extracted, into a bucket of water, and then pumping water in at one end:—a stream will issue strongly at the other end, although several feet distant, almost immediately, and without any intermediate part having become sensibly tense. Of course, in the living body, in cases of spasm or obstruction, the liquid must be thrown in against resistance very gradually.

"That case is called *introsusception* of the bowels, in which an upper portion falls or is received into a portion below, and the receiving part, mistaking the received for descending food, holds it fast. This occurrence forms a complete obstruction, and generally proves fatal. Many infants, with irritable bowels die of it. Now, a copious enema, such as we have described above, is almost a certain cure. The liquid advances, until it reaches the part where the portion of gut has been swallowed by gut below; and as it cannot pass without pushing the introsuscepted portion back to liberty, it effects the cure."—Arnott's Elements of Physics, or Natural Philosophy, page 614.

be retained, it ought not to exceed five or six ounces in quantity, and if it be composed of stimulating ingredients, as all purgative mixtures are, it should not exceed half that quantity. Previously to the administration of these kinds of injections, a lavement of warm water to clear the bowels should precede it, and the temperature should not be raised above 96° or at most 98° of Fahrenheit.

4th. *The* TIME *most proper for the* ADMINISTRATION *of Lavements, is in the* MORNING.

There is a sympathetic relation between the upper and lower bowels, by which, as was formerly stated, the actions of the former may be quickened or excited by stimuli applied to the latter; and by a converse reciprocity, the lower bowels often obey very readily, a stimulus applied to the upper; as is sometimes observable after taking purgative medicine, that a natural evacuation speedily succeeds the reception of the medicine into the stomach, the *purgative* effects of which do not follow for several hours after. From this physiological association arises that inclination to stool, which in many persons immediately succeeds some particular meal, and more especially breakfast; to assist, therefore, this indication of nature, and to give effect to the natural effort, the lavement should be administered immediately

after breakfast, by which also another benefit is obtained by costive persons, that of establishing a regular period of evacuation.

5th. *The Immission of Lavements should be effected* SLOWLY, *and regulated according to the Sensations produced.*

If the lavement be thrown up at once or by quantities in too rapid succession, the reaction of the bowel occurs immediately, and produces an irresistible desire for its expulsion, without accomplishing the object in view; but if the distension of the rectum be gradually effected, and the temperature of the liquid do not exceed that of the bowels, the latter are not sensible of its introduction. Three or four minutes should be occupied by the immission of each pint of liquid, and if the desire to reject it arises before it is *all* thrown up, the operation should be suspended for a minute or two until the inclination subsides; but if the sensation continue painfully urgent, the injection should be allowed to come away, and another of the original quantity afterwards administered. It frequently happens that very little liquid can be borne at one time, and that several attempts are requisite to throw up the whole lavement, each portion being

rejected without bringing away any thing with it;—but at length the bowels will admit at one application a large quantity, and a full and copious relief ensues. But it also sometimes occurs, when a lavement is thus injected and rejected in small quantities only, that each effort discharges some trifling portion of fæces;* in this case, the attempts to introduce at least a pint of liquid or more, should be continued, until the bowel will receive the whole portion at once, without inconvenience or immediate expulsion.

6th. *It is expedient to* AVOID THROWING IN AIR *with the Injection.*

The bowels contain, it is true, a considerable portion of air, as well as some kind of gases

* A short time since, a lady, after four days constipation, had recourse, by my advice, to the use of the lavement; she had scarcely thrown up a tea-cupful when she was obliged to withdraw the instrument and allow the fluid to escape; a bulk of fæces equal to one usual daily evacuation was discharged with it. A second attempt was now made to throw up the remainder, but no more could be received than before, and a bulk of fæces equal to the former, passed with this also. The experiment was tried a third time, when the reception of rather less than half a pint only could be endured, but fæces were again discharged with it. The instrument was applied a fourth time, and three pints were received without inconvenience and retained about a quarter of an hour, when it began to act, and discharged a quantity of fæces, more than equal to the whole of the three previous motions.

evolved by chemical operations going on within them; for it is well known, that the portion of atmospheric air contained in the intestinal tube is sufficient to support life in many insects to whose existence it is indispensable. But it must be allowed that, by natural and spontaneous means, the introduction of air into the stomach and bowels is effected in so gradual a manner that these organs, probably, accommodate themselves to its reception, without being inconvenienced by it. Not so, however, when by mechanical or accidental means it is introduced into the intestines in a sudden manner, and in considerable volume; griping, sickness, and even vomiting, have been known to succeed such an accident. Every part of a lavement apparatus should, therefore, be air-tight, and the atmosphere, which is of course contained in various parts of the syringe and tubes, expelled from it before the pipe is inserted into the bowel.

7th. *The* BLADDER *should be* EMPTIED *before a* COPIOUS *Injection is administered.*

The pressure of a distended bladder oftentimes interrupts the free passage of an injection along the rectum, or produces a stimulus upon it, by which the lavement is prematurely expelled. During pregnancy the gravid uterus is also apt to produce the same effect; in the latter case it

is advisable that the patient should have the operation performed by an assistant, whilst she reclines on the right side, which takes off the pressure of the uterus from the sigmoid flexure of the colon; and in the former, that the patient should make water before the lavement is injected, if no mechanical obstruction in the urinary passages deprives him of the power of doing so.

8th. *The* FIRST IMPULSE *to discharge a Lavement should be* RESISTED.

Soon after the immission of a lavement, a pungent irritation ensues at the anus, which calls urgently for the expulsion of the liquid. If the sensation be disregarded, it soon subsides, but shortly afterwards a slight degree of griping comes on in the belly about the region of the navel, somewhat similar to that produced by purgative medicine. This uneasy sensation is the best promise of the approaching efficacy of the remedy, as it shews that its influence has extended through the course of the colon, and is invariably followed by a full and copious exoneration of the bowels. This is one of the most important axioms connected with our subject, and should in every instance be complied with as far as may be practicable.

9th. *A Lavement is sometimes* PERMANENTLY RETAINED, *and does not pass off by the Bowels.*

In this case no serious apprehension need be entertained of any mischief arising from the retention of the liquid, as it becomes absorbed and carried off by the kidnies.* Where this frequently happens, a table-spoonful of common salt, or a tea-spoonful of ox's gall should be dissolved in the water; or a purgative injection may be substituted for it.

10th. EXERCISE *and* COLD AFFUSION *are useful* ADJUVANTS *to the Operation of Lavements.*

The agitation of the viscera produced by exercise (especially equitation), will frequently give efficacy to a lavement, which otherwise would have been wanting.† Friction and pressure, or

* Dr. Cullen says he has known a quart of liquid absorbed by the rectum in the space of an hour.

† A young gentleman, subject to constipation, complained to me that a lavement had never in any single instance brought away the contents of the bowels. I advised him to throw up a quart of tepid water, and immediately to walk briskly about the garden. On the first application of this plan, a considerable motion was procured, and, as he informs me, he has several times since pursued the same course with equal success. In a similar case I advised the patient to cross his horse and trot a distance of five or six miles, and immediately upon dismounting to take a lavement. This plan was equally successful.

kneading of the belly with the hands, conjoined with injections, often succeed in obstinate cases of obstruction, in producing fæcal evacuations. When the bowels are exceedingly torpid and do not respond to the stimulus of a lavement, sponging the belly with cold water immediately after injecting the liquid, will often succeed in soliciting evacuations. The use of the cold bath and of lavements on alternate days, (from the relation which is known to subsist between the mucous membranes and the skin) contributes to the same desirable effect.

11th. APERIENTS *may sometimes be efficaciously* COMBINED *with Lavements.*

Numerous instances exist of a disordered condition of the stomach and small bowels attended by debility and torpor of the large. The *former* is indicated by a furred tongue, sense of heat dryness and bitterness of the mouth and throat, uneasiness about the region of the stomach, slight head-ache, vertigo, diminished or irregular appetite, &c. (constituting a disorder which in popular language is nonsensically denominated "bilious," or "an attack of the bile.") The *latter* is characterised by flatulence, distension, and constipation. The faulty action of the stomach and upper bowels demands the

exhibition of such gentle aperients as will carry away their contents and relieve the morbid state of the mucous lining. But aperient medicines active enough for this purpose are not sufficiently powerful to overcome the torpidity of the lower bowels; and if, to accomplish this latter object, recourse be had to efficient doses of purgatives, that injurious and interminable habit of requiring them, which has been so frequently deprecated in this work, may become thereby confirmed. To remedy these evils, and to obtain the combined utility of both modes of practice, four grains of the compound gamboge pill with a grain of calomel—or two grains of the extract of rhubarb, two grains of the compound extract of colocynth, and one grain of powdered ipecacuan, made into a pill, may be taken at bed-time, and a lavement the following morning. By these means the mucous lining of the whole alimentary tube will be restored to healthy action, and both the small and large bowels cleared of their contents. The pill may be repeated every third evening, for two or three weeks, when it should be discontinued for a week or two, and then resumed for a like space, if necessary; the lavement, if the bowels require it, may be repeated daily without intermission.

12th. *The* EVACUATIONS *succeeding the Immission of a Lavement should be* INSPECTED.

No evidence, save that of ocular demonstration, is a sufficient assurance of the proper effect of a lavement. Persons are frequently deceived by the sensations attending the expulsion of an injection, and are led to imagine that they have passed a copious motion, when, in fact, they have discharged nothing but the lavement. Examination, therefore, is an important part of the practice of intestinal injection.

In the foregoing rules, it must be understood that *warm water* only is meant, except where medicated injections are specially mentioned. At page 40 it was shewn, that in certain positions the belly becomes either tense or lax, and, consequently, the passage of an injection will be either impeded or facilitated, by the posture of the body during the act of administration. Of course, that position is the most favorable in which the viscera sustain least pressure *ab externo*, and this, undoubtedly, is obtained, by curving the body forwards and drawing up the thighs. This is demonstrated almost daily, for we see how naturally persons adopt this position, who are suffering with pain or tenderness of the

belly. In self-injection therefore of lavements, the patient should sit rather stooping forwards, so as to bring the abdomen towards the thighs; and when administered by an attendant, the invalid should be instructed to draw the knees upwards, bringing the thighs to a right angle with the body.

The Efficacy of Warm Water *Lavements considered, in the Treatment of* habitual Costiveness *and* Diseases *of* Irritation.

Clysters of warm water simply, are well suited for the correction of habitual costiveness; and as the remedy is always at hand, so is it likewise preferable (in these cases) to medicated liquids. One or two pints of warm water may be administered every morning, if necessary; the *same hour* being chosen as nearly as possible for the operation. It is especially serviceable to mercantile men, who are much confined to the desk or the shop, and to those whose unrelieved employments in business or professional pursuits, often prevent them from attending to the calls of nature, and thus establish an irregularity of the bowels, productive of many uncomfortable feelings and disorders. To literary persons, who

are peculiarly obnoxious to confinement of the bowels, the warm water injection is equally necessary. But to females, in particular, it presents a remedy, to which they should constantly and unhesitatingly have recourse against constipation; the evils of which (to the sex) have been before discussed. In chlorosis, and in cases of accidental suppression of the menses, the warm water lavement frequently proves very beneficial; here its effects seem to be owing to its fomentative property and to its stimulating the uterus and contiguous parts. When used with this view, the temperature of the water should be raised to as high a degree as it can be borne, and a pint injected into the rectum twice a day, the patient sitting at the same time in the warm hip-bath.

During the progress of fever, it is necessary to preserve the bowels clear, by applying the warm water lavement once or twice a day; in fevers of the typhoid kind, this practice is still more imperative, not only with the intention of washing away acrid colluvies, but as a succedaneum for purgative medicines. The great determination of blood to the viscera, and the morbid sensibility of the internal parts, which take place in yellow fever, render the injection of warm water into the bowels particularly eligible for diluting the diseased secretions, and preventing irritation from the collection of fæces.

Sailing is well known to tend to constipation;

and in long voyages, the evil is of course exasperated by the want of due exercise and by the qualities of the food. Persons, therefore, making voyages, and seafaring people generally, will derive essential benefit from the warm water lavement, which should be used daily, if necessary. Sea-water may be applied in the same manner, but is of course more active in its effects; it is found to be very useful when flatulence attends costiveness.

It is well known that persons residing in the East and West Indies, Africa, &c. are highly disposed to visceral congestion and irritation; hence, it ought to be an object of paramount interest and anxiety to every European, residing in intertropical regions, or countries of high temperature, (more particularly at their first arrival) studiously to obviate constipation both by direct and indirect means. During a domicile in such latitudes, constant attention should be directed to the means of ensuring a regular state of the bowels, and I know of none so safe, efficient, and agreeable, as the Lavement Machine. I will venture to assert, that were this plan more generally adopted by merchants and military men, particularly the latter, we should meet fewer individuals with jaundiced countenance, diseased liver, and broken constitution; for whom, neither the splendid fruits of commerce, nor the honorable rewards of public

service, can procure health and comfort. To residents in such climates, I would strongly recommend the daily administration of one or two pints of warm water, provided the bowels do not *spontaneously* act with regularity. Persons whose digestive and biliary systems have been injured by warm climates, should not persist in a constant practice of taking purgative medicines, the effect of which is to debilitate these organs still more, and to increase the torpidity of the alimentary canal; a basin of warm water unloads the bowels, without, in the least, contributing to render them more costive afterwards, which purgative remedies do.

The soothing influence of warm water lavements is experienced in inflammatory affections of the kidnies, bladder, uterus, peritonæum, &c. and in cases of morbid irritation of the stomach, small intestines, liver, prostate gland, and urethra. A copious injection of warm water should be administered once or twice a day by those who are the subjects of stricture of the rectum, and should at all times precede an attempt at evacuating the bowels. When retention of urine ensues from stricture or spasm of the urethra, the patient may often be enabled to make water by the immission of a warm lavement, which takes off the spasmodic constriction, and allows the urine to flow: the same relief frequently succeeds this remedy in those painful cases where calculous concretions

lodge in the ureters, or these tubes are affected by gouty metastasis. In the latter instances, the quantity of liquid thrown up, should be considerable, (three or four pints) and its efficacy is increased by its administration in the warm bath.

A copious lavement of warm water has the property of relieving lumbago most remarkably, especially at the same time with the warm bath. I have also observed, that the introduction of a bougie into the urethra is facilitated in difficult cases, by injecting warm water* into the rectum. It may not, perhaps, be unnecessary to add, that in all cases where warm lavements are administered with the intention of relieving irritation and spasm, their efficacy is promoted and increased by their being used *in the bath*, and the *hip*-bath is often a convenient mode of employing it.

In the replacement of an introsuscepted portion of intestine, five or six quarts (or even more) of tepid water may be thrown up: should the practitioner hesitate upon the propriety or safety of this bold practice, I refer him to the remarks of Dr. Arnott, p. 82.

Obstinate constipation demands the use of purgatives in conjunction with repeated injections of warm water: the quantity of fluid administered should be copious (three or four quarts), and the purgative medicine should be combined with a

* And still more so, if a dram of laudanum be added.

sedative* to lessen the spasmodic stricture of the colon, which usually accompanies cases of extreme severity.

Cold *Lavements shewn to be beneficial for* Piles *and other* hæmorrhoidal *Diseases; with precautionary Remarks upon their Administration, and a Recommendation of the* Douche Ascendante.

If the propriety of using *warm* injections is to be doubted in any cases, those of Hæmorrhoids or Piles are certainly of this questionable kind. Warm lavements, acting locally as all tepid applications do, produce an increased afflux of blood to the rectum, and, consequently, where piles exist, tend to the farther engorgement of the hæmorrhoidal vessels: irritating clysters are, of course, still more objectionable. I do not think, upon the whole, that *warm* or stimulating lavements should be used by persons who are subject to frequent and severe attacks of piles; but such persons may, I conceive, with considerable benefit, use *cold* injections under certain

* Compound Extract of Colocynth and Extract of Hyosciamus, of each half a dram; Calomel, twelve grains; Opium, three grains. To be made into eighteen pills; three of which to be taken every two hours.

limitations. I consider that in *sanguineous* or *bleeding* piles, the use of cold or astringent lavements should not be adopted until other means had been had recourse to and failed, and even then with great caution; for we know, that fatal diseases are sometimes brought on by an injudicious suppression of the hæmorrhoidal discharge. But for *blind* piles, a *cautious* application of cold lavements is unquestionably useful; and for this purpose five or six ounces of cold water may be injected once a day, to soften and dislodge the fæces. Water, though cold, has the property of stimulating the rectum and expulsatory muscles and procuring motions; at the same time lessening the pain and mischievous straining, which usually accompany going to stool, when piles are irritable or inflamed. When piles are painful, or occasion tenesmus, or bearing down at the anus, and sympathetic irritation of the urethra, two or three ounces of cold water gives great and instantaneous relief, and may be thrown up, two or three times a day, if the uneasy sensations return.

There are no sufferings more agonising than those hæmorrhoidal pains, produced by various morbid conditions of the anal extremity of the rectum;—these are especially mitigated by the immission of small quantities of cold water; but M. Montegre, who has published a masterly description of these diseases, recommends, in pre-

ference, the use of the cold 'douche ascendante.' I attended a lady with nervous pains about the anus, (succeeding vaginal inflammation) which regularly came on every evening, occasioning acute suffering for several hours: she resorted to the use of the cold douche, which soon removed the disorder, after opium, hyosciamus, and sedative applications had failed. These pains, when aggravated by fissures of the anus, are of the most intolerable kind; the gentleman's case, whom I mentioned at p. 6, was of this nature, and his sufferings, which I had but too often the melancholy task of witnessing, are truly depicted by the following description of Montegre.

" The patient experiences, on going to stool, a slight pain, the seat of which is always the same. This pain is at first so slight as to be scarcely perceptible. But after an interval, varying from a few minutes to an hour or more, it assumes an intensity that is compared by the patient to what might be expected from the introduction of a red-hot iron into the anus. This anguish persists generally till the patient falls exhausted into a sound and prolonged sleep, from which he awakes free from pain. The state of tranquillity continues till he next has a stool, when he is destined to go again through the same train of suffering. When this complaint has continued for a considerable time, the patient becomes affected with an habitual despondency,

which is strongly depicted in his countenance. He emaciates rapidly, often avoids eating, from the fear of having a motion."*

The successful removal of these pains by the use of the cold douche ascendante, is detailed by M. Montegre, in the following cases.

Case 1.—" A man, 34 years of age, of good constitution, but hæmorrhoidinary from an early period, had, during the last few years, experienced long and painful attacks of the complaint under consideration. The last attack had now continued three months, without any relief from pain, though a great number of remedies had been used in vain. Each evacuation was followed by the excruciating pains already described, so that the poor man was often deprived of sleep for whole nights together, was reduced to despair, and almost entirely abandoned food, for fear of the sufferings attendant on the evacuation of the fæces. In this state, he commenced the use of the ' douche ascendante,' by means of a syringe with a crooked pipe. The first effect of this application was a diminution of the pains, and the reduction of the hæmorrhoidal tumors, so as to be reducible within the sphincter. The process was continued for three or four days, and the pains ceased entirely. He has now been five years free from complaint."

Case 2.—" The second case was that of a man, 40 years of age, of plethoric constitution, who had been ten years affected with internal piles, without any discharge. A sedentary life, without any regular rest, for some months, had caused an hæmorrhoidal swelling, attended by inflammation, and, finally, by ulceration. To this state was added the excruciating pains in question. Having a water-closet, of English construction, he contrived to have the jet of water thrown against the anus, which gave him instant relief, for a time. He renewed the application every time the pain came on, which was sometimes very often in the twenty-four hours, and always with the same effect. By persevering in this plan a month, or six weeks, the ulcerations healed, the hæmorrhoids disappeared, and the pains ceased."

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* I have copied this paragraph, as well as Montegre's two cases, from the Medico-Chirurgical Review, for April 1825.

In conclusion, I would briefly remark, that *large* quantities of cold water cannot safely be thrown into the bowels under any circumstances, but that *small* quantities may be safely and efficaciously used for the relief of those hæmorrhoidal affections before mentioned; always bearing in mind, that the application of cold water in cases of sanguineous discharge, must be resorted to with very great caution. To mitigate the pain occasioned by piles and other hæmorrhoidal diseases, in going to stool, the cold lavement should be thrown up, when the inclination to pass a motion comes on.

Diseases *in which* Laxative *Clysters are indicated; with a Reference to the Formulary.*

Fever.—The necessity of keeping the bowels open during the course of fever by lavements, has been before pointed out; and this practice is equally imperative, whilst the patient is in a state of convalescence, in order to remove collections of stimulating fæces from the lower bowels, which at this time are apt to ensue, from more food being taken than can be digested, giving rise either to visceral irritation or relapse of the disease. It frequently happens, that after the cessation of fever, the bowels are left in a sub-inflammatory state, which the irritation

of retained fæces urges on to ulceration of the mucous surface. During fever *two* motions should be procured daily, and at least *one* through the state of convalescence: either of the formulæ 1, 2, 3, are very appropriate, if the bowels are disposed to be torpid.

Nephritis.—Clysters in this disease are not only necessary to preserve the bowels in a lax state, but to act as an internal fomentation to the kidnies. No. 6. is a good formula to effect the indication, and may be used daily; a pint or two of warm water may also be thrown up at intervals.

Cystitis.—The same treatment by clysters is applicable as for inflammation of the kidnies, except that as the bladder is more nearly contiguous to the lower bowel than the kidnies, a smaller quantity of fluid as a lavement is requisite to act fomentatively than in Nephritis, which requires the clysters to penetrate into the transverse arch of the colon. The formula No. 8. may be chosen for this purpose, and should be used at least once a day, it being absolutely necessary to prevent irritation of the bladder, from accumulation of fæces in the rectum. As in the case of Nephritis, so in this disease also, water lavements may be injected at intervals, heated to 106° or more; the warmth of which tends to mitigate the pain and uneasiness.

Gastritis.—The state of the stomach, as well as the sickness occasioned by the disease, mani-

fest the impropriety of irritating this organ by purgative medicines in the early stages of the disorder. The bowels must therefore be kept open by mild clysters, frequently administered, of which the formulæ Nos. 4, 5, and 6, are proper examples. The liability to an inflammatory excitement of the stomach in *exanthematous* fevers, justify the cautions against active purgation, given at page 6.

Enteritis.—A difference of opinion is entertained of the propriety of administering purgative medicines in the first stage of inflammation of the bowels. Its opponents contend that the stimulus of the medicine aggravates the inflammation, and that the practice is *absurd,* inasmuch as the contingency is coupled with an impossible condition; *i. e.* that the inflammation deprives the alimentary canal (or the affected parts of it) of its capability of performing its natural and usual functions; whilst at the same time, the purgative medicines administered, are urging it to an exercise of those functions. On the other side it is advanced, that the morbid irritation of the bowels being of a specific kind, is subdued by the counteracting and opposite irritation of purgative remedies; and farther, that the first effects of the inflammation being an inversion of the peristaltic motion of the bowels, so the readiest means of removing the disease, are those agents which tend directly to restore the proper and accustomed action of the alimentary tube. I can-

not here enter into the discussion, nor is it necessary I should even state which side I am disposed to advocate; suffice it to say, that all parties agree in the necessity of procuring fæcal evacuations as speedily as possible, and the enema presents itself as a remedy, which practitioners of every school gladly employ. Either of the first fourteen laxative formulæ, more particularly Nos. 7. and 9. are proper for this purpose; but, I think, that copious injections of warm water are preferable: they relieve pain, relax spasm, (always attendant on inflammation,) promote the secretion of the mucous membrane, soften the fæces, and stimulate the alimentary canal to its proper peristaltic action. But the quantity of water must be large, several quarts even; indeed, there should be no other limit to the measure than the capability of the patient's bearing an increased quantity, and the operation should be repeated, until copious motions are procured.

Rheumatism and *Gout*.—The effect of a simple and single exoneration of the bowels daily, is truly desirable, during the course of all diseases attended with pain and inconvenience from the patient's variations of posture; and Rheumatism and Gout being of this kind, as well as of a febrile character also, the enema executes the double office of unloading the bowels with little locomotive disturbance. Any of the formulæ, from 1. to 9. may be adopted.

Pneumonia.—The generally atonic character of pneumonic inflammation, or at least the liability of the system, to sink under its influence into a typhoid state, causes the propriety of the exhibition of purgative medicines to be somewhat equivocal; but gently aperient injections can never be mis-employed, so as to keep the bowels slightly soluble. Formula 3. may be selected.

What has been stated under the head Gastritis, refers so distinctly to *Measles*—*Small Pox*—*Erysipelas*—and *Scarlatina*—that it need not be recapitulated; but as most of these diseases occur more especially to infantile subjects, the moderation of the quantity and strength of the enema must, of course, be regulated by the practitioner's discretion.

Colic.—Whatever may be the *exciting* cause of Colic, whether flatulence, accumulated fæces, indigestible food, poisons, worms, intestinal calculi, acrid bile, acidity, retained meconium, gouty metastasis, stricture, or the fumes of lead, the *proximate* cause is certainly spasm, and the mode of cure is simply to relieve this, and to discharge the offending substance. The vomiting frequently attendant on Colic, prohibits the administration of medicines by the mouth; and the obstinate state of spasm, and inverted action of the whole alimentary canal, render the effect of purgative remedies taken into the stomach entirely nugatory. In the treatment of this disease,

more reliance may be placed upon injections than upon any other treatment. They should be administered liberally, and any of the formulæ 10, 11, 12, 13, or 14, may be chosen, and their efficacy, most probably, increased, by their being largely diluted, or diffused in a considerable quantity of water, say, several pints. I have witnessed admirable effects from the immission of six or eight pints of warm lin-seed oil, the spasm appearing to yield to the emollient nature of the remedy, and the bowels immediately discharging their contents. Copious injections of warm water often produce the same effects; and to assist their operation, the water may be impregnated with soap.* The imprisonment of flatus should be obviated, by medicating the purgative injections with antispasmodic ingredients, and *turpentine* possesses peculiarly both these qualities. The formulæ 23, 24, 25, 26, and 27, present examples of this kind. The *spirit* of turpentine, though less a purgative than the native turpentine, possesses, nevertheless, considerable aperient and antispasmodic properties; especially when, in combination with carminatives, it is applied as a clyster in flatulent Colic and windy disorders of the bowels; of which, formula 27. is an example. Opium, conjoined

* According to Dr. Cullen, the soap has no purgative quality, and only tends to the expulsion of the fæces, by lubricating the surfaces.

with a purgative, proves very useful in Colic, to lessen the irritability of the stomach, and induce Catharsis. See formula 30.

Constipation.—Obstruction of the bowels arises from one or other of the causes, enumerated before as occasioning colic. Indeed, the first, spontaneously glides into the last; most cases of constipation being attended with such acute spasmodic pains of the bowels, as to merge every other feature of the disease in this its most prominent character; and the term colic, therefore, is usually adopted as the most appropriate name by which to designate the disorder in an aggravated form. The foregoing remarks on the treatment of Colic by Clysters, brief as they are, (and as I am not writing a Treatise on Medicine, necessarily so,) suffice for their practical application in all the varieties of constipation.

Flatulence.—This is not only a symptom of several diseases, but is frequently found to be an idiopathic disorder, arising from original debility of the alimentary canal. It has been conjectured, that the bowels of those persons subject to flatulence, actually secrete the air by which the intestinal tube is tormented. Whether this be correct, and, if true, whether this gaseous secerning function be the peculiar and unfortunate privilege of weak and irritable bowels only, I am not to argue: but, I am somewhat disposed to ascribe the leading feature of the com-

plaint to a morbid irritability of the nervous structure of the intestinal canal, by which the muscular fibres are easily and frequently thrown into a state of spasmodic contraction; the phenomena of gaseous inflation and disturbance, becoming developed as *secondary* symptoms only. The learned Baron Van Swieten seemed to entertain an opinion of this nature; for he says, "the intestines *always contain gas*, but that it does not occasion either belching or flatus, unless from spasms of the bowels. Whilst the air is unconfined in the intestines, it does no hurt; but it appears, by experiments made upon living animals, that if the intestine be irritated in any place, it is immediately drawn together with a strong spasm; if it is touched again in another place, at a small distance, it is constricted there too: and presently the intermediate part of the intestine is inflated by the rarefaction of the air within. When, therefore, an acid by its irritation produces spasms in the intestines, by which they are contracted in several places, the air within *rarefies* and *distends them;* and when the spasm is relaxed, it passes upward or downward with violence; or else shifting its place only, it wanders through the intestines with a murmur, called *borborygmos*, or rumbling of the guts." It seems, therefore, that elastic gas is always contained in the bowels, but, that it does not produce griping and the symptoms of flatu-

lence, except the intestines are thrown into spasmodic contraction by some irritating cause.

As this state of the alimentary canal is commonly accompanied by costiveness, the employment of laxative remedies is doubly indicated, and unquestionably the most eligible mode of administering them is by injection. The choice and combination, however, of this class, is a matter of some moment. The objects in view, are to allay spasm, and evacuate the bowels;—the first to be accomplished without stimulating the intestines unduly, or to a degree hazarding the production of inflammation;—and the second, without inducing either irritation or debility.* Clysters, therefore, used by persons subject to flatulent costiveness, should contain some warm stimulating purgative, dissolved in an infusion of bitter, aromatic, or carminative herbs; and amongst these, *camomile,* as a bitter conferring tone upon the bowels, is exceedingly conspi-

* I have generally found it useful, and, indeed, necessary, in the treatment of flatulent complaints, to tranquillize and strengthen the alimentary canal, and to stimulate the bowels by a warm purgative. To accomplish this, I have found no plan so efficacious as the exhibition of the Quinine with Hyosciamus, under the former indication;—and of the resin of copaiba to answer the second. Whilst writing these remarks, I receive the following report from a patient under similar treatment:—"The last medicines are of infinite service to me—my bowels are far less flatulent and painful, and I have a copious and easy motion, (which gives me great relief) every day, without using the enema."

cuous: take formula 33. as an example. Plants of the verticillate order, fulfil a similar intention, as the pennyroyal, peppermint, &c.; see formula 34. The seeds of the umbellate order of plants, are also useful under the same views; as the fennel, coriander, and aniseed: see formula 35. Amongst the aromatics, the terebinthinate tribes furnish an adjunct to aperient clysters, eminently adapted for flatulent constipation. Turpentine is a laxative, and a diffusible stimulus; the latter principle residing in its essential oil, which is much less laxative when separated from the resin; (see formulæ 27, 28, and 29.) It solicits an afflux of blood, to the parts affected by its action; induces to them a determination of nervous energy; and equalizes both when deficient in degree, or unequally distributed. Hence, its beneficial effects in the disease under our consideration, which must be considered to arise from debility of the intestinal canal: this debility rendering the bowels inactive or torpid, and leaving their secreting mucous surface and the viscera connected with them in function, in a state of atonic imbecility.*

* There can be no doubt that carminative and aromatic medicaments thrown into the large bowels, will relieve the *small* intestines from flatus and spasm, and even the stomach itself from cramp. This effect, which results from the sympathy between the upper and lower bowels, (as explained formerly) is more readily induced by conjoining hot fomentations exter-

Apoplexy.—The necessity for acting on the bowels, and the difficulty generally of administering medicines by the mouth, suggest at once the use of clysters. Strong and drastic purgatives may be injected, and repeated, if they are retained without producing any effect or are rejected without unloading the bowels. The formulæ 15, 16, and 17, may be selected. Dr. Chapman, of Philadelphia, advises the immission of, from 20 to 50 grains of emetic tartar, in the form of clyster, for obstinate obstruction of the bowels, and might not, therefore, the same remedy be useful in apoplectic cases?

Asthma.—The mere exoneration of the bowels is exceedingly serviceable during the paroxysm of this complaint, and the benefit is enhanced by combining with the purgative an antispasmodic remedy in the form of clyster, as shewn in formulæ 20 and 22.

Hysteria.—This disease has an intimate relation with the functions of the bowels, either as cause or effect; and in some forms of the disorder, the administration of laxative clysters is indispensable; viz. when the patient remains in

nally, with the clysters. To shew the serious view the ancients took of the injurious consequences of flatulency, a ludicrous anecdote is told of the Emperor Claudius, who, they say, "*meditatus edictum, quo veniam daret flatum crepitumque ventris in convivio emittendi, cum periclitatum quendam præ pudore ex continentia reperisset.*" Sueton. in Tib. Claud. Cæs. § 32. page 477.

a protracted state of insensibility. In this form of Hysteria, there is usually severe cramp, or spasm of the stomach or small intestines; which, from the sympathy between the upper and lower bowels, (as explained at p. 16,) may be relieved by an antispasmodic laxative enema, such as formula 20 or 21.

Tetanus.—Whether the cause of the disease be irritation and accumulation in the intestinal canal, or from any other source, the safest and best mode of unloading the bowels, is by laxative injections alone or in combination with gentle aperients. In no case, is griping and violent purgation proper, as it occasions irritation and recurrence of the spasms.

Retention of the Meconium.—The excrementitious secretion of the colon during the fætal state, denominated the Meconium, if retained after birth, occasions flatulence, griping, and sometimes convulsions; in anticipation of which, it is usual with nurses to cram something* down an infant's throat as soon as it is born. A natural, and, indeed, the best remedy, is the mother's milk; but, if this fail, recourse should be had to injections, as no purgative medicine can be received into the stomach without more or less disordering it immediately or remotely. A tea-

* A mixture of butter and sugar—and of honey and *cinder dust*, are two *elegant* examples of puerperal Pharmacy.

spoonful of honey, or of soft soap, or of common salt, in a tea-cupful of warm water, may be thrown into the bowels; and if, without success, ten grains of aloes dissolved in a quarter of a pint of milk. Either of these may be repeated as occasion requires, great care being taken in the introduction of the pipe, and attention paid to the temperature of the liquid, which should not exceed 100°.

Poisons. — Whenever poisonous substances have been taken, copious injections should be administered to sheath the bowels, inviscate, dilute, and discharge the poison. These injections may be composed of fat broths, barley water, gruel, milk, thin starch, lin-seed tea, solution of gum arabic or arrow root, or any emollient liquid that can be most easily and readily prepared. They must be thrown up abundantly, and repeated often. An example of a purgative enema applicable to cases of poison, may be found in the Formulary, No. 14.

It may be remarked in conclusion, that the administration of laxative injections as a succedaneum for purgative medicines whilst mothers are suckling, affords this great advantage, that it does not disorder the infant.

FORMULARY

OF

INTESTINAL INJECTIONS,

ARRANGED ON THERAPEUTICAL PRINCIPLES,

AND

ILLUSTRATED BY PATHOLOGICAL REMARKS.

I. LAXATIVE.

(1)

Take of, Barley Water ..... 1 pint
Common Salt ..... 1 ounce
Mix.

This is an useful injection for costiveness attended with flatulence.

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(2)

Take of, Water Gruel ..... 11 ounces
Olive Oil ..... 1 do.
Epsom Salt ..... ½ do.
Incorporate the Oil with the Yolk of an Egg, and add the Gruel, having first dissolved the Salt.

LAXATIVE CLYSTERS.

(3)

Take of, Water Gruel	½ pint
Lenitive Electuary ..... } Olive Oil, of each ..... }	1 ounce
Antimonial Wine	3 drams

Mix.

The two preceding clysters may be applied for the removal of costiveness, but the latter is the most active, and is recommended by Dr. Clarke, as operating quickly. I should not advise its habitual use.

(4)

Take of, Sulphate of Soda	1 ounce
Warm Water (100° Fahr.)	¾ pint
Olive Oil	2 ounces

Mix.

(5)

Take of, Epsom Salt	1 ounce
Warm Water (at 100°)	1 pint
Castor Oil	1 ounce

Mix.

(6)

Take of, Croton Oil	6 drops
Water Gruel	1 pint

Mix.

LAXATIVE CLYSTERS.

(7)

Take of, Colocynth Pulp ..... 1 dram
Water ..... 12 ounces
Boil for a few minutes, and strain.
Pharm. Barth.

(8)

Take of, Castor Oil ..... } 1 ounce
Honey, of each .... }
Rub them together, and add, of Oatmeal
Gruel ..... 10 ounces
Pharm. Guy.

(9)

Take of, Manna ..... 1 ounce
Olive Oil ..... 1 do.
Epsom Salt ..... ½ do.
Decoction of Camomile, viz. ..... 10 do.
Camomile Flowers ½ ounce; Carraway Seeds ½ ounce; Fennel Seeds 2 drams; Water 1 pint.—Boil fifteen minutes, and strain.
Mix. Pharm. Dub.

The preceding formulæ (4, 5, 6, 7, 8, & 9,) are examples of gently aperient clysters, rather more active than lavements of water only. They are applicable for the removal of costiveness, whenever it may be desired to give a little more stimulus to the bowels than mere warm water

communicates, or when the latter does not readily succeed in producing fæcal evacuations. They are also useful in assisting and quickening the operation of cathartic medicine. Clysters of this kind should be retained, if possible, ten or fifteen minutes, otherwise no benefit will be obtained from the medicinal impregnation of the menstruum.

I may here observe, that various simple substances and mixtures are often resorted to in the composition of domestic clysters; such as fat broth, milk, whey, gruel, decoctions of linseed, camomile flowers or mallow root;* to which are occasionally added one or two table-spoonsful of common salt, honey, treacle, moist sugar, salad oil, soft soap, castor oil, &c. These simple compounds are readily prepared, and may be used advantageously in most cases, where the whim or experience of the administrator gives them a preference to mere water. The temperature of these injections should not exceed 100° of Fahrenheit's thermometer, and they will be retained more easily at a lower heat even than this; viz. at 96° or 98°.

* These emollient liquids are very serviceable for washing out the intestines in cases of Dysentery and Cholera Morbus; a pint or two may be injected three or four times a day.

LAXATIVE CLYSTERS.

(10)

Take of, Senna Leaves ..... 6 drams
Boiling Water ..... 12 ounces
Infuse an hour in a covered vessel; add
Sulphate of Soda ..... 1 ounce
Castor Oil ..... ½ do.
Mix.

(11)

Take of, Pulp of Colocynth ..... 1 dram
Water ..... 12 ounces
Boil for a few minutes, and add
Common Salt ..... ½ ounce
Syrup of Buckthorn ..... ½ do.
Mix. Pharm. Guy.

(12)

Take of, Socotrine Aloes, powdered ..... 2 drams
Subcarbonate of Potass ..... ½ do.
Gruel (or Milk) ..... 1 pint
Dissolve the Potass in the warm liquid; then rub the Aloes with the Yolk of an Egg, and mix the whole together gradually.

(13)

Take of, (Simple) Extract of Colocynth .... 3 drams
Water ..... 3 pints
Boil, for 20 minutes, and strain; add
Epsom Salt .....
Castor Oil, of each ..... } 1 ounce

LAXATIVE CLYSTERS.

(14)

Take of,	Leaves of Senna	4 ounces
	Water	1 pint
Boil for ten minutes, and to the strained liquid add		
	Glauber's Salt	½ ounce
	Antimonial Wine	4 do.

Mix. *Orfila on Poisons.*

The five preceding formulæ 10, 11, 12, 13, and 14, are examples of actively purgative clysters, adapted for cases of constipation, which resist the administration of water lavements and the milder medicated injections. Formula 13, presents an active injection suitable for obstinate and protracted constipation, and 14, for cases of painters' colic. Orfila also advises the last formula to be used in cases of powerful intoxication, when the person remains insensible for a longer time than inebriety usually lasts; which is ten, twelve, or fifteen hours. The same is also applicable for hastening the expulsion of poisons, for which it is one of the most effectual applications of this class.

LAXATIVE CLYSTERS.

In preparing intestinal injections, it should be always borne in mind, that their retention is very considerably determined by their bulk, the expulsion of a *large* quantity ensuing more quickly than a *small* one. Little or no increased effect from an enema, is procured by the addition of cathartic ingredients, if the bowels do not retain the injection a sufficient time to receive an impulse from its *purgative* principles. In most cases, therefore, where a decidedly cathartic effect is sought, the enema ought not to exceed three or four ounces; I say, *most* cases, because it sometimes happens that the muscular structure of the bowels is so torpid, that they cannot even expel an injection, and under such circumstances I prefer combining the purgative principle with a copious quantity of liquid, as shewn in formula 13. The propriety of this can only be ascertained by experience, but usually only small quantities should be injected when a general purgative effect is intended. As a general rule for preparing this class of purgative clysters, the quantity of the several ingredients may be four t mes what the dose would be, if intended to be taken by the mouth. The following formulæ 15, 16, 17, present very active purgative compounds, and their effect upon the bowels, when they have been cautiously administered and properly

retained, corresponds with their strength. They are exceedingly useful in cases of Phrenitis and Apoplexy, particularly in the latter, whilst the patient remains comatose.

(15)

Take of, Senna Leaves	½ ounce
Colocynth Pulp	½ dram
Boiling Water	6 ounces

Infuse for an hour, and add

Epsom Salt	1 ounce

Express the liquid, and throw it up slowly at 98 degrees.

(16)

Take of, Infusion of Senna	4 ounces
Compound Extract of Colocynth ...	2 drams
Tincture of Jalap	½ ounce

Mix.

(17)

Take of, Aloes, powdered	1 dram
Castor Oil	1½ ounce
Milk	3 do.

First rub the Aloes with a small quantity of Yolk of Egg, and next incorporate the Castor Oil; lastly, add by degrees the Milk; and dissolve in the Emulsion,

Emetic Tartar	4 grains

Rub the whole well together.

LAXATIVE CLYSTERS.

The two following formulæ 18, 19, are recommended by Dr. Clarke as purgatives in apoplectic cases; but I have in the last formula changed the quantity of tobacco, from a handful of the leaves, to a dram of the dried tobacco of the shops, as being a more determined dose.*

(18)

Take of, Antimonial Wine .....
Syrup of Buckthorn, of each .... } 1 dram
Decoction of Marshmallows ..... 12 ounces
Mix.

(19)

Take of, Leaves of Rue .....
——— Pennyroyal, of each ... } 1 handful
Tobacco ..... 1 dram
Pulp of Colocynth ..... 2 do.
Boil in one pint of Water to ..... 10 ounces, and strain.

* Especial caution is always necessary in administering tobacco, and I would not in this formula have ventured on so large a quantity as a dram even but, from the certainty, nearly, that the injection will be expelled, through the combined agency of the tobacco and the colocynth, before the former can exert its whole influence on the system.

LAXATIVE CLYSTERS.

The three succeeding formulæ 20, 21, 22, are examples of Antispasmodic and Purgative Clysters.

(20)

Take of, Water Gruel	12 ounces
Assafœtida	3 drams
Castor Oil	½ ounce

Rub the Assafœtida and the Oil with the Yolk of an Egg, and then gradually incorporate it with the Gruel.

USE.—For administration in the Paroxysm of Asthma; and in Hysteric Fits, when the patient is incapable of taking medicine by the mouth.

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(21)

Take of, Assafœtida ... . } Castor, of each ..... }	1 dram
Olive Oil	2 ounces
Water Gruel	10 do.

To be incorporated with the Yolk of an Egg.

USE.—In Hysteric Paroxysms attended with constipated bowels.

LAXATIVE CLYSTERS.

(22)

Take of, Epsom Salt	1 ounce
Assafœtida	1 dram
Lin-seed Oil	1½ ounce
Syrup of Buckthorn	1 do.
Decoction of Mallows	½ pint

Mix.

USE.—To mitigate the Paroxysms of Asthma. *Clarke.*

(23)

Take of, Venice Turpentine	1 ounce
Triturate it with the Yolk of an Egg, and add gradually	
Warm Water	1 pint

This form of enema, Dr. Cullen remarked, was one of the most certain laxatives that could be employed in colics and other cases of obstinate costiveness.

(24)

Take of, Common Turpentine	½ ounce
The Yolk of an Egg.	
Decoction of Pearl Barley	10 do.

Mix. Pharm. Barth.

USE.—Constipation attended by colicky pains and flatulence.

LAXATIVE CLYSTERS.

(25)

Take of, Venice Turpentine	½ ounce
Incorporate it with the Yolk of an Egg, and mix it gradually with	
Barley Water	½ pint
Olive Oil.....	1½ ounce
Sulphate of Soda	6 drams
Tincture of Opium	½ do.

This enema is highly useful for colic, attended by severe spasms of the bowels. It is also commended by Dr. Clarke in Nephritis, with much pain and bloody or purulent urine.

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(26)

Take of, Venice Turpentine	6 drams
Olive Oil	3 ounces
Sulphate of Magnesia	3 drams
Decoction of the Root of Marsh-mallows	10 ounces

Mix.

The above is one of the best forms of a purgative enema, for the relief of flatulent colic.

LAXATIVE CLYSTERS.

(27)

Take of, Aniseeds, bruised ..... }	
Castile Soap, of each ..... }	½ ounce
Water	1½ pint

Boil them till reduced one half, then add

Spirit of Turpentine	1 ounce
Tincture of Assafœtida	½ do.

Incorporate the two latter with the Yolk of an Egg, and mix all together.

This enema is useful in colic and flatulent pains of the bowels, and is often administered with considerable relief during a fit of gravel. In Tympanites, it may be administered twice or three times a day.

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(28)

Take of, Castor Oil	2 ounces
Spirit of Turpentine	2 drams
Water Gruel	½ pint

Mix.

The Author of the "Treatise on the Means of obviating the Varieties of Costiveness," recommends the above in colic and obstinate obstruction of the bowels.

LAXATIVE CLYSTERS.

(29)

Take of, Spirit of Turpentine ..... 3 drams
Gum Arabic, powdered ..... ½ ounce
Water Gruel ..... 12 do.
Mix.

The above is serviceable in those attacks of colic, to which hysterical females are subject, and according to Dr. Thomas, is very efficacious in spasmodic suppression of urine, combined with 30 or 40 drops of laudanum.

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(30)

Take of, Infusion of Senna ..... 10 ounces
Opium .... 3 grains
Mix.

The Opium here tends to the relaxation of the spasmodic state of the bowels in Colica Pictonum, and to bring them under the influence of the Senna; thus at once relieving pain and procuring evacuations. It should be retained as long as possible, that both the Senna and Opium may act by absorption; and to effect this, the injection should be thrown up slowly, and not too warm, the patient remaining in bed, keeping himself as quiet and tranquil as circumstances will permit.

LAXATIVE CLYSTERS.

(31)

Take of, Aniseeds, bruised .....
Camomile Flowers, of each ... } ½ ounce
Boil them in a pint and a half of water to one-half, and add
Sulphate of Soda ..... 6 drams
Castor Oil ..... 1 ounce
Mix.

This is a carminative purgative enema, useful in flatulent colic, and is recommended by Dr. Thomas to be thrown up every four hours, to expel wind and abate spasm.

---

(32)

Take of, Extract of Colocynth ..... ½ dram
Infusion of Senna ..... 10 ounces
Castor Oil ..... 1 do.
Mix.

The above is recommended to assist the operation of purgatives in cases of obstruction of the bowels, and in Colica Pictonum, after the spasm of the intestines has relaxed, and the stomach become composed.

LAXATIVE CLYSTERS.

(33)

Take of, Camomile Flowers	½ ounce
Water	1½ pint
Compound Decoction of Aloes ...	1 ounce
Soft Soap	½ do.

Boil the Camomile Flowers in the Water for half an hour, and strain; when the liquid has cooled down to 108°, add the Aloes and Soap, and immediately throw it up.

This enema is very efficacious in dispelling flatulence, and procuring evacuations in spasms of the bowels. If the first injection does not properly clear the bowels, the patient continuing distressed by flatus, it may be repeated a few hours afterwards.

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(34)

Take of, Leaves of Peppermint (fresh) ...	2 ounces
(or of the dried 1½ ounce.)	
Boiling Water	1 pint

Infuse for a quarter of an hour, and strain; then add

Table Salt ..... } Honey, or coarse Sugar, of each }	1 ounce

This carminative laxative enema is useful as a domestic lavement, to persons of weak, flatulent and costive bowels, and may, if necessary, be administered daily.

LAXATIVE CLYSTERS.

(35)

Take of, Sweet Fennel Seeds .....
Coriander Seeds ..... } 1 ounce
Aniseeds, of each (bruised) ... }
Water .... 1½ pint
Boil to one-half, and strain; then add
Lin-seed Oil ..... 3 ounces
Mix.

When the bowels are oppressed and griped with flatus, the above will generally afford relief, or may be repeated till it does.

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(36)

Take of, Venice Turpentine ..... 1 ounce
Decoction for Clysters* ..... 10 do.
Oil of Juniper .... 2 drams
Oil of Turpentine .... 1 do.
Syrup of Marshmallows ..... 2 ounces
Moist Sugar ..... 1 do.
Mix, with the Yolk of an Egg.

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* "DECOCTION FOR CLYSTERS,"
FROM QUINCY'S DISPENSATORY.

Take of, Mallow Leaves (dried) ..... 1 ounce
Camomile Flowers ..... } ½ do.
Sweet Fennel Seeds, of each ... }
Water .... 1 pint
Boil, and strain.

LAXATIVE CLYSTERS.

(37)

Take of, Venice Turpentine	½ ounce
Milk	8 do.
Lin-seed Oil	3 do.
Syrup of Marshmallows	2 do.
Oil of Turpentine ..... }	2 drams
—— Aniseed, of each ..... }	
Moist Sugar	a spoonful

Mix, with the Yolk of an Egg.

(38)

Take of, Balsam of Copaiba	2 drams
Decoction for Clysters	8 ounces
Castile Soap	½ do.
Oil of Camomile Flowers	2 do.
—— Juniper ..... }	1½ dram
—— Aniseeds, of each ..... }	
Moist Sugar	1 ounce

Mix.

The preceding formulæ 36, 37, 38, are recommended by Dr. Quincy, in the following terms: "But besides evacuating and softening the bowels by this means, there is an intention of great moment, which is conveniently assisted this way, and that is, strengthening and astringing them in long and obstinate diarrhœas and dysenteries."

II. ANODYNE CLYSTERS.

The leading articles of this Class of Clysters, are Opium and Tobacco. Opiate injections prove of infinite service in fevers, when sickness and collapse of the system arise from debility occasioned by excessive or misdirected depletion. The same remedy is also useful in cholera morbus, to quiet the stomach and lessen the irritation of the alimentary canal. In hæmorrhagia and other uterine diseases, opiate injections are frequently found to be more beneficial than injections of the vagina itself. When gout attacks the kidnies, laudanum in clysters affords exceeding relief, and should be promptly used. In urinary irritation and obstructions, opium administered by the rectum, produces a salutary effect, that can be equalled by no other means; and, when combined with turpentine, its utility in all nephritic disorders is indisputably increased. Opiate clysters alleviate the irritation of diseased prostate gland; of ulcerated rectum; of tenesmus, induced by acrid purgatives, frequent motions, or gonorrhœal inflammation of the urethra; of the passage of calculous concretions through the ureters; of stone in the bladder, and of spasmodic stricture of the

urethra. In the same manner, opium relieves the nausea and vomiting of pregnancy, and facilitates the passing of bougies into the bladder. Its effects in checking diarrhœa, are those of an astringent as well as an anodyne; and in those complaints of the bowels to which it is applicable, the remedy may be administered in this manner, without that disturbance of the stomach and system, which often result from its being taken into the stomach. Dr. Percival, in a letter to Dr. Duncan, says, " In violent colics, attended with vomiting and an obstinate constipation of the bowels, it has been the common practice amongst Physicians to give opiates in conjunction with purgatives. This method of treatment has been lately improved, by administering the opiate first, and the purgative an hour or two afterwards. But, I take the liberty of suggesting to you another mode, which, as far as my experience extends, has proved the most successful. I direct three or four ounces of a strong decoction of poppy-heads, with twenty, thirty, or forty drops of laudanum, to be injected into the intestines, and retained as long as possible. If it be speedily discharged, the clyster is repeated till the pain is relieved and the vomiting ceases. A dose of calomel and jalap,

or of any other brisk cathartic, is then administered, and its operation quickened by the use of senna tea, of a solution of the neutral salts, or of castor oil. *By this process*, evacuations are procured, with more ease, certainty, and expedition, *than by any other* which I have tried. For opium, when given in a *clyster*, does *not* check the peristaltic motion of the intestines, nor counteract the operation of any purgative, so powerfully as when *received into the stomach*. And in this way it is most efficacious in alleviating the sickness, and in putting a stop to the violent retchings, with which colics are often attended."

The remark formerly made, that the quantity of an injection should be *very small*, when intended that it should be retained, especially applies to opium: a clyster of this description, should not exceed three ounces, and the opium should be diffused in some bland unirritating liquid; gum arabic and starch dissolved in hot water, are proper vehicles for this purpose. It is, however, sometimes useful to combine opium in a clyster, with such articles as we are pretty certain, either from their stimulating and cathartic properties, or from their bulk, will soon be rejected from the rectum; but still, in these

cases, we expect that the injection may be retained long enough for the opium to act in some degree, so as to lend its aid in assisting the general intention of the other ingredients, or directing their influence upon some particular organ or part. With this view, the quantity of the clyster may be somewhat larger than in the former case; of which formulæ 25 and 30, are examples. Opium administered per anum, may be increased to three times the usual dose taken into the stomach, which, to an adult, may amount to one hundred drops or more. But, in apportioning the dose to infants, the extreme sensibility of young children to opium, must not be forgotten. I administered nine drops of laudanum in a clyster to one of my children, when an infant of four months old, for the relief of watery gripes, and the child slept *sixteen* hours afterwards. An anodyne enema for an infant must not exceed an ounce.

ANODYNE CLYSTERS.

(1)

Take of, Laudanum ..... 1 dram
Thin Starch ..... 3 ounces
Mix.

(2)

Take of, Confection of Opium ..... 2 drams
Gum Arabic ..... ½ ounce
Milk ..... 3 ounces
Mix.

(3)

Take of, Opium ..... from 2 to 4 grains
Gruel ..... 3 ounces
Mix.

These formulæ, Nos. 1, 2, 3, are applicable for Diarrhœa when the motions are thin and frequent; they also lessen the frequency of the stools and relieve the distressing tenesmus in cases of Dysentery and Cholera Morbus, in which disorders, any of the foregoing menstrua, without the laudanum, may be thrown up in an increased quantity, three or four times a day, to defend the mucous membrane of the intestines from the acrimony of the secretions. "Common emollient injections," says Dr. Mason Good, in his Remarks on Diarrhœa Tubularis, "afford

temporary ease; and a diluent and anodyne injection of warm water and laudanum alone, repeated twice a day, still more so." Mr. Clarke recommends a clyster made by boiling three drams of ipecacuan in a quart of water, till reduced to a pint, to be injected twice or thrice a day in dysenteric diseases. The tormina and spasm of the bowels, and sickness of the stomach occasioned by the acrid bile poured out in Cholera Morbus, must be quieted by opium, until the excessive secretion of the liver is expended, and this is to be attempted by repeated injections. Clysters of this class should be used at the temperature proper for injections generally, viz. at about 98° or 100°, or, perhaps, a little warmer.

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(4)

Take of, Confection of Opium	}	2 drams
Extract of Catechu, of each	}	
Starch Mucilage		3 ounces

Mix.

This enema is administered to check the colliquative diarrhœa of Phthisis, griping and bloody stools.

ANODYNE CLYSTERS.

(5)

Take of, Confection of Opium ..... 2 drams
Conserve of Roses ..... 1 ounce
Spirit of Cinnamon ..... 1 do.
Water Gruel ..... 3 do.
Mix.

This is proper in purging of long standing, such as Chronic Dysentery, &c. It is, as also the preceding, both anodyne and astringent.

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(6)

Take of, Laudanum ..... 2 drams
Olive Oil ..... 3 ounces
Mix.

This is useful in relieving the pain which accompanies Hernia Humoralis, after leeching and opening the bowels; it should be injected whilst the patient sits in the hip-bath, the scrotum being supported by a suspensory bandage. It relieves the tenesmus attendant on the latter months of pregnancy; and of Colica Pictonum, after the bowels have been freely opened. In fact, it is serviceable in all cases in which there is great irritation about the rectum or uterus; and in diminishing spasmodic affections of the urethra and neck of the bladder. It should be made milk warm, by its containing vessel being plunged into a basin of hot water.

ANODYNE CLYSTERS.

(7)

Take of, Laudanum	2 drams
Venice Turpentine	3 do.
Olive Oil	½ ounce
Water	6 do.

Mix, with the Yolk of an Egg.

(8)

Take of, Laudanum ..... } Balsam of Peru, of each ..... }	1½ dram
Water	½ pint
Olive Oil	2 ounces

Mix, with the Yolk of an Egg.

(9)

Take of, Decoction of Poppy-heads	½ pint
Balsam of Copaiba	2 drams
Olive Oil	2 ounces
Laudanum	1 dram

Mix, with the Yolk of an Egg.

The formulæ 7, 8, 9, are recommended to be injected as occasion requires, for retention of urine from spasm about the neck of the bladder, and for alleviating pain in cases of gravel and stone. They are anodyne and laxative; but probably the opium may often cause them to be retained for some time, but rarely altogether on account of the oil contained in their composition, which generally discharges them with the fæces, after an interval longer or shorter, according to circumstances.

ANODYNE CLYSTERS.

(10)

Take of, Laudanum	.....	1 dram
Camphor	.....	½ do.
Gum Arabic, powdered	.....	1 ounce
Water	....	3 do.

Reduce the Camphor to powder by trituration with a few drops of Spirit of Wine; then mix it intimately with the Gum Arabic; lastly, incorporate it with the Water, and add the Laudanum.

The above affords great relief to urinary spasm and irritation, and when injected whilst the patient is seated in the hip-bath, or in conjunction with hot fomentation to the pubes and genital organs, is the best remedy for Strangury that can be applied.

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(11)

Take of, Laudanum	....	4 drops
Oil of Aniseed	..... }	5 do.
—— Juniper, of each	..... }	
Starch Mucilage	.....	1 ounce

Mix.

This anodyne carminative injection may be administered to infants suffering from gripings and pains of the belly, after the bowels have been opened by aperient medicine or a laxative clys-

ter. If purging from acidity accompanies the disorder, the quantity of laudanum may be increased two or three drops, and the chalk mixture with aromatic confection should be taken into the stomach three or four times a day.

Tobacco is also a powerful remedy in this class of clysters, for which it seems most peculiarly calculated;—when infused in water and injected into the rectum, its effects, according to Dr. Cullen's opinion, are more powerful upon the system than when taken into the stomach. Its application clysterwise is chiefly useful in violent Constipation,* Colics, Hernia, Tetanus, Retention of Urine, &c; and, in these diseases, the benefit produced seems to be derived from the influence of the tobacco in relaxing the morbid rigidity of muscular fibres in a state of spasmodic contraction.

* The smoke of tobacco is preferred by many practitioners in cases of constipation, colic, &c.; but there is this objection to it, that it does not admit of application in such a defined measure of strength as the infusion. I am at the same time ready to grant, that the smoke, probably, diffuses itself with more facility through the large intestines than a *liquid* injection, and passing the valve of the ileum, penetrates into the small bowels. The following formulæ present examples of tobacco injections.

ANODYNE CLYSTERS.

(12)

Take of, Tobacco ..... 1 dram
Boiling Water ..... 1 pint
Infuse for ten minutes, and strain.

In cases of strangulated Hernia, half of the above should be first administered, and the remainder half an hour afterwards, if the Hernia remain unreduced, and the nervous system of the patient be capable of sustaining safely the effects of the second injection.

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(13)

Take of, Tobacco ..... 20 grains
Boiling Water ..... 4 ounces
Infuse for an hour, and strain.

To be injected every six hours in cases of Tetanus, to relax Spasm;—and in spasmodic Retention of Urine; in the latter case, it rarely fails to procure a discharge of the bladder, when productive of nausea and syncope.

ANODYNE CLYSTERS.

(14)

Take of, Tobacco	1 dram
Boiling Water	2 pints

Infuse for half an hour, and to the strained liquid add

Sulphate of Magnesia	2 ounces
Olive Oil	3 do.

The torpor of the Intestines, which accompanies Tetanus, demands correction; and, at the same time, the spasmodic contractions of the muscular system should, if possible, be moderated or allayed. The above formula fulfils both intentions, and may be repeated according to circumstances. It is also a powerful remedy for obstructions of the bowels, and violent constipation with colic.

Hyosciamus and *Hemlock* are also, occasionally, very useful remedies of this class, especially when opium disagrees with or disorders the patient, be it administered in whatever manner it may, as is the case with some constitutions.

ANODYNE CLYSTERS.

(15)

Take of, Extract of Hemlock .....
——— Hyosciamus, of each... } 20 grains
Starch Mucilage ..... 3 ounces
Mix.

To be injected every four hours, for the relief of severe pains, arising from carcinomatous disease of the uterus.

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(16)

Take of, Extract of Hyosciamus ..... 1 dram
Camphor ..... 1 scruple
Gum Arabic ..... ½ ounce
Milk ..... 6 do.
Mix, according to the directions given, with formula 10.

This enema, administered two or three times a day, affords considerable relief in irritative diseases of the Uterus, Bladder, Prostate Gland, and Urethra: it abates the ardor urinæ, arising from gonorrhœal inflammation; and with the addition of thirty drops of laudanum, is a valuable remedy in painful menstruation. In these cases it should be retained, if possible; and, therefore, the contents of the bowels should be removed by a laxative injection previously to the immission of the Anodyne.

III. ANTISPASMODICS.

Our class of antispasmodics will be necessarily very limited, inasmuch as few articles of the Materia Medica are possessed of such qualities as confer upon them the power of counteracting spasm generally. The *cause* of spasm, as well as the function and structure of the part or parts affected, determine *the kind* of remedy which, in every individual instance, operates an antispasmodic effect: thus, in spasm from debility, *tonics* are of this kind—from deficient nervous influence, *stimulants*—from obstruction of the bowels, *purgatives*—from excessive irritability, *sedatives*, and so on: by which we perceive that remedies of an opposite character produce the same effect upon diseases, different in nature but marked by symptoms common to them all. In this view, numerous antispasmodics are included in our previous classes of laxatives and anodynes. In the former, may be noticed the carminative plants and seeds—turpentine—antimony—and even the *warm* menstruum, in which the ingredients of the enema are dissolved. In the latter, opium and tobacco are decidedly antispasmodic in their effects. But, of *pure* antispasmodics, or those remedies *intrinsically* so, we have, perhaps, few or no examples; the nearest approach to an abstract

character of this kind, is found in those articles marked by powerful or fœtid effluvia, as musk, assafœtida, amber, castor, and some others.

(1)

Take of, Tincture of Assafœtida ..... 2 drams
Oil of Amber ..... 30 drops
Water Gruel ..... ½ pint
Mix.

(2)

Take of, Gum Assafœtida ..... 2 drams
Barley Water ..... ½ pint
Mix, with the Yolk of an Egg.

(3)

Take of, Musk ..... ½ dram
Gum Arabic ..... ½ ounce
Gruel ..... 4 do.
Mix.

(4)

Take of, Castor ..... 2 drams
Starch Mucilage ..... 4 ounces
Mix.

The above formulæ 1, 2, 3, and 4, are advantageously employed in hysteria, when the state of the patient renders it difficult to administer medicine by the mouth. When injected, under

these circumstances, into the rectum, they tend to shorten the paroxysm and restore the patient to consciousness.

---

(5)

Take of, Oil of Pennyroyal ..... }	
——— Rue, of each ..... }	1 dram
——— Amber	2 do.
Gum, Assafœtida	1 do.
Water Gruel	6 ounces

Mix, with the Yolk of an Egg.

This is a very powerful antispasmodic, and is applicable for hysteria, with the same intention as the preceding, especially if the stomach be much oppressed with flatulence.

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(6)

Take of, Camomile Flowers ..... }	
Pennyroyal ..... }	1 handful
Rue, of each ..... }	
Seeds of Henbane ..... }	
——— White Poppies, of each }	½ ounce.

Boil them in a pint of Water till only half a pint remains, and strain; add, by means of the Yolk of an Egg,

Assafœtida	1 dram
Venice Turpentine	2 do.

This enema possesses considerable reputation for its efficacy in Hysteric Colic.

ANTISPASMODIC CLYSTERS.

(7)

Take of, Gum, Assafœtida ..... 3 drams
Opium ..... 6 grains
Gruel ..... ½ pint
Mix.

In Convulsions of child-bed women, the above is employed with good effect.

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(8)

Take of, Laudanum ..... 5 drops
Oil of Aniseeds ..... 4 do.
Olive Oil ..... 3 drams
Water Gruel ..... 3 ounces
Mix.

For griping and belly-ache of infants, if the bowels are lax; if not, they should previously be opened by an injection of four or five ounces of warm water.

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(9)

Take of, Confection of Rue ..... ½ dram
Gruel ..... ½ pint
Mix.

This is administered in convulsive disorders of infants.

ANTISPASMODIC CLYSTERS.

Æther has been used in the manner of injection as an antispasmodic remedy by some practitioners, but of its effects in this way I have had no experience. I should consider its exceedingly vaporizable quality as unfavorable to its immission into the bowels, at least, in any notable quantity. An American practitioner has, however, lately published the report of a case of Spasmodic Constriction of the Colon, which was removed by injections of half an ounce of assafœtida with *an ounce* of æther, repeated every *two* hours; *all of which were retained*, until *twelve* ounces of æther had been received into the bowels! I have understood, that half an ounce of æther administered in a clyster has, by its rapid conversion into vapour, produced a distressing distension of the bowels, and in some cases ascended into the stomach and been discharged by the mouth in voluminous eructations. This fact seems to favor the hypothesis, noticed at page 142, that gas, vapour, or smoke, may readily pass the valve of the ileum, when injected *liquids* may be excluded.

IV. ASTRINGENTS.

Clysters of this class should be injected cold, or, at least, at a temperature of about 55°. In winter, therefore, it is requisite that they should be warmed, and in summer cooled down to the proper standard. They should be injected slowly, and retained as long as possible.

(1)

Take of, Extract of Catechu ..... 2 drams
Boiling Water ..... 6 ounces

(2)

Take of, Galls, powdered ..... 3 drams
Water ..... ½ pint
Boil, till one half is consumed, and strain.

(3)

Take of, Oak Bark, bruised ..... ½ ounce
Water ..... 12 ounces
Alum ..... 1 dram
Boil to one half, and strain.

ASTRINGENT CLYSTERS.

(4)

Take of, Logwood, rasped	1 ounce
Alum	1 dram
Water	1 pint

Dissipate one half by boiling.

The preceding formulæ 1, 2, 3, 4, are proper astringent clysters for piles, or hæmorrhoidal tumors *within* the sphincter ani; where the tumors are *external* to the sphincter, these medicated liquids should be applied as lotions; or the astringent articles formed into a paste or ointment. Astringent injections may be administered twice or three times a day.

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(5)

Take of, Sulphate of Zinc	½ dram
Distilled Water	½ pint

Mix.

(6)

Take of, Super-acetate of Lead	½ dram
Distilled Water	½ pint

Mix.

Astringent clysters of the sulphate of zinc and of the super-acetate of lead, are found to be useful when inflammation exists in the rectum or the hæmorrhoidal tumors about it.

ASTRINGENT CLYSTERS.

(7)

Take of, Logwood	1 ounce
Oak Bark	
Galls, of each (bruised)	
Water	2 pints

Boil, till only one pint remains, and in the strained liquid, whilst hot, dissolve,

Gum Arabic	4 ounces

And add,

Laudanum	1 dram

Half a pint of this liquid may be injected into the rectum, twice a day, in cases of *prolapsus ani*, or half that quantity for children, with whom the complaint is more frequent. The management of these cases should be as follows: The patient, on feeling an inclination to go to stool, should inject three or four ounces of *cold* water into the rectum, which assists in bringing away the fæces with less straining or propulsive efforts, whilst the influence of the *cold* lavement increases the elasticity of the bowel, and promotes its retrocession.* As soon as the motion has been discharged, if the bowel does not return by the natural efforts, it should be carefully replaced by gentle pressure of the hand,

* In those cases where the cause of the disease arises from an undue contraction of the sphincter ani, the cold water injection, previously to passing a motion, communicates a temporary tone that lessens the spasmodic action by which the rectum, during its natural protrusion in discharging its contents, is entangled and prevented from retracting within the verge of the ring.

or of a sponge or soft pledget of linen wetted with cold water or a solution of alum. If this plan fail, the finger being oiled and introduced into the bowel, carries the protruded intestine back to its proper situation. The injection is to be immediately thrown in, and repeated in a similar manner after every motion: or should but one evacuation happen daily, it may, nevertheless, be administered twice a day. If a considerable portion of the bowel protrudes, and I have seen six or eight inches, a pint of the injection may be used at once; in this case, it is prudent to make the liquid slightly tepid.

When any of these diseases are attended by hæmorrhage, whether accidental or habitual, great caution is necessary in the use of cold or of powerful astringents; nothing but an excessive degree of the discharge, and a weakened state of the system produced by it, will warrant their application.

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(8)

Take of, Lime Water	.....	12 ounces
Red Rose Leaves, powdered	...	2 drams
Gum Kino, of each	.....	
—— Arabic	.....	2 ounces
Laudanum	.....	½ dram

The above is an useful clyster for chronic Diarrhœa, and may be injected twice a day.

V. ANTHELMINTICS.

The application of medicines of this kind, in the form of clyster, has certainly been overrated. It is necessary to the destruction of intestinal worms, that the remedy should be brought into contact with the animal. Now we know, that most of these parasitical tormentors inhabit the *upper* portion of the bowels; and we also know, that injections per anum do not penetrate into the small intestines, except indeed, they are administered in exceedingly large quantities, so great, as, perhaps, not to be endured under common circumstances. Injections, therefore, as usually administered, can be of no avail in removing worms, occupying the small intestines, as the long round worm and the tape worm; both of which dwell in the ileum, and feed upon the chyle. The thread worms or ascarides, of which there are two varieties, reside in the lower bowels; the first, or *long* thread worm, takes up its abode usually in the cæcum, and is, therefore, more within the reach of intestinal injections; the second is located in the rectum, and may be certainly destroyed by various preparations administered in this manner; of which the following are examples.

ANTHELMINTIC CLYSTERS.

(1)

Take of, Aloes, powdered ..... 1 dram
Milk ..... 6 ounces
Boil them together until the Aloes are dissolved.

(2)

Take of, Spirit of Turpentine ..... 2 drams
Water Gruel ..... ½ pint
Mix, with the Yolk of an Egg.

(3)

Take of, the Hairs of Cowhage ..... 1 scruple
Water Gruel ..... 6 ounces
Mix.

(4)

Take of, Lime Water ..... 6 ounces
Tobacco ..... 10 grains
Macerate the Tobacco in the Lime Water, in a covered vessel, by the fire-side, for six hours, frequently stirring it.

ANTHELMINTIC CLYSTERS.

(5)

Take of, Camphor ..... 1 dram
Olive Oil ..... 2 ounces
Mix.

(6)

Take of, Sulphuret of Potass ..... 1 scruple
Rose Water ..... 6 ounces
Mix.

(7)

Take of, Nitrate of Silver ..... 2 grains
Distilled Water ..... 4 ounces
Gum Arabic, in powder ..... ½ ounce
Mix.

Any of the preceding may be administered to children of every age, and repeated every day or two, until all the worms are destroyed. It may at the same time be proper also, to give a purge every other day, of calomel, jalap, scammony, &c. to clear away the slime in which the ascarides envelope themselves.

ANTHELMINTIC CLYSTERS.

In addition to the preceding formulæ, adults may make choice of either of the following.

(8)

Take of, Olive Oil ..... 8 ounces
Spirit of Turpentine ..... 1 do.
Mix.

(9)

Take of, Olive Oil ..... 2 ounces
Turpentine ..... } ½ ounce
Assafœtida, of each ..... }
Water ..... 8 do.
Dissolve the Assafœtida in the Water, then blend the Oil and the Turpentine with the Yolk of an Egg, and mix the whole together.

Ascarides may be also destroyed by injections of rue, savin, wormwood, and common salt.

Anthelmintic clysters may be rendered tepid by plunging them into a basin of hot water for a few minutes before they are used.

VI. TONICS.

These injections often become necessary, either on account of the patient refusing to swallow bark, or of the stomach not being able to retain it. The first happens commonly with children; the latter to adults in the advanced stages of fever, and during the progress of intermittents, when the stomach is in so irritable a state as to reject every thing put into it. The difficulty of deglutition in Cynanche Maligna renders it impossible sometimes, for the patient to swallow, even liquids; and here, therefore, we are glad to have recourse to bark in clysters. In the infantile state we are also frequently obliged to avail ourselves of this mode of exhibiting the bark, as in cases of thrush, erysipelas, &c. It is also found, that in certain cases of local debility, the administration of tonic clysters proves more serviceable than the same remedy taken into the stomach; of this kind may be adduced those distressing and harassing symptoms which arise from deficient excitability or atony of the bladder and rectum. In the treatment of fluor albus, some practitioners place considerable reliance on the utility of tonic lavements, and the same is also considered as highly conducive to the prevention of those repeated abortions, which, when a habit of miscarrying is once

TONIC CLYSTERS.

established, usually occur about the third month of each succeeding pregnancy. The invention of the *Sulphate of Quinine* has very much diminished the necessity for bark clysters; as this excellent and powerful chemical compound admits of exhibition without an equal liability of creating disgust or disturbance of the stomach as the bark in substance, and few cases arise where it cannot be retained if properly administered. Our examples of this class, therefore, will necessarily not be numerous.

(1)

Take of, Extract of Bark ..... 2 drams
Warm Water ..... 4 ounces
Opium ..... ½ grain
Dissolve.

(2)

Take of, Peruvian Bark, powdered ..... 1 ounce
Water ..... 1 pint
Boil to one half, and add
Confection of Opium ..... 2 scruples
Mix.

(3)

Take of, Bark in Powder ..... ½ ounce
Barley Water ..... 6 ounces
Laudanum ..... 20 drops
Mix.

The preceding formulæ 1, 2, 3, are examples of

injections containing the bark in its three states, viz. in substance, decoction and extract; either may be administered, every three or four hours. *The opium guards the retention of the lavement.*

---

(4)

Take of,	Extract of Bark	1 dram
	Warm Water	2 ounces
	Laudanum	4 drops

Mix.

This is a good formula for administering bark to children of two years old; the dose to be proportionally reduced for younger ones; it may be repeated three or four times a day.

---

(5)

Take of,	Sulphate of Quinine	8 grains
	Rose Water	8 ounces
	Laudanum	20 drops

Mix.

Where the stomach will not retain it, the above may be injected three or four times a day —a child of ten years may receive three or four grains: the dose to be increased or diminished according to the age of the patient.

STIMULANT CLYSTERS.

the menses—chronic vaginal discharges and in arousing parturient action. Some of these also, as mustard, vinegar, salt, &c. are important in their effect of arousing the vires vitæ in cases of suspended animation. Articles of this class, are of course prohibited when fever or inflammation is present.

(1)

Take of, Horse-radish, sliced	1 ounce
Mustard Seeds, bruised	½ ounce
Boiling Water	12 ounces

Macerate for two hours, and strain.

This is a beneficial stimulant for elderly or paralytic persons, who have a difficulty in retaining the urine or of evacuating the fæces; the former arising from atony of the sphincter of the bladder, and the latter from debility of the rectum.

(2)

Take of, Grains of Paradise	1 dram
Cubebs	1 ounce
Cloves	1 dram
Boiling Water	12 ounces
Macerate for two hours, and strain, then add Honey	½ ounce

This injection may be used with the same intention as the preceding. I have also in some

instances seen good effects result from its use in chlorotic females, and in cases when suppression of the menses was connected with a weak and debilitated constitution.

(3)

Take of, Vinegar ..... ½ pint
Hot Water ..... 1½ ditto
Mix.*

(4)

Take of, Mustard, in powder ..... 1 ounce
Hot Water ..... 1 pint
Mix.

(5)

Take of, Common Salt ..... 4 ounces
Hot Water ..... 1 pint
Mix.

The formulæ 3, 4, 5, are adapted for stimulating the viscera in cases of suspended animation from drowning, or the respiration of the fumes of burning charcoal. They may be raised to the temperature of 108° or 110°.

* Injections of vinegar and other vegetable acids have been recommended by some authors as antiseptics in fevers, dysenteries, &c.; but I have had no experience of their utility in these diseases.

STIMULANT CLYSTERS.

2nd. *Injections of* DIFFUSIBLE *Stimuli.*

The influence of this class is not confined to the bowels, but is rapidly communicated to the whole nervous and vascular system, and is applicable to cases of suspended animation from drowning, excessive cold, mephitic vapours, &c.; and to asphyxia of new born infants.

---

(6)

Take of, Barley Water ..... 1 pint
Spirit of Hartshorn ..... 1 ounce
Mix.

(7)

Take of, Essence of Peppermint ..... 1 ounce
Barley Water ..... 1 pint
Mix.

(8)

Take of, Brandy (or other spirit) ..... 2 ounces
Barley Water ..... 1 pint
Mix.

(9)

Take of, White Wine .....
Boiling Water, of each ..... } ½ pint
Mix.

STIMULANT CLYSTERS.

(10)

Take of, Spirit of Turpentine ..... 2 ounces
Water ..... 1 pint
Mix, with the Yolk of an Egg.

(11)

Take of, Sulphuric Æther ..... 1 ounce
Hot Water ..... 1 pint
Mix.

These injections may be thrown into the bowels of persons apparently dead from drowning, suffocation or excessive cold: in cases of still-born infants, the quantity of the spirit may bear the proportion of a tea-spoonful to an ounce as respects the preceding formulæ. Barley water, gruel, lin-seed tea, or even water may be used as the vehicle; but it may be worth observing, that the spirit should be added at the moment of application, otherwise the heat (which should be nearly 110^0) will dissipate its strength. The vapour of the alcoholic principle, probably penetrates into the small intestines and ascends even into the stomach. It is also advisable to inject hot negus, or spirit and water into the stomach by means of the stomach pump.*

* It is not generally known, that with the addition of an œsophagus tube, the enema syringe is a stomach pump; persons procuring the former, would do well to obtain the stomach tube also, by which, for a trifling additional expense, they would possess the means of affording more effectual relief in cases of accidents.

VIII. DEMULCENTS.

Injections of this class have little or no medical properties:*—they only serve as vehicles for inviscating and involving those articles that are rough and acrid; or they are used as unirritating pabula to secure the retention in the rectum of other medicinal agents. They are also not less useful in blunting, by commixture with them, the acrimony of many morbid secretions; and of sheathing the mucous surface of the intestines from their irritation. Clysters of this nature are prepared with gum arabic, isinglass, tragacanth, starch, quince-seeds, lin-seeds, iceland moss, hartshorn, arrow-root, pearl barley, gruel, marshmallows, milk, butter, oil and fat broths—The mode of preparing most of these is so obvious, and of many of them such an every day occurrence, that only a few examples will be here offered.

(1)

Decoction of Lin-seed.

Take of, Lin-seed, bruised .. .. 6 drams
Water .... 2 pints
Boil for ten minutes, and strain.

* It is yet a doubtful question, whether any agent acts upon the living fabric as an emollient; if there be such agents they must be very few, and limited, I think, to water, oil and caloric. An emollient property is commonly attributed to demulcents, but, I think, without sufficient evidence or reason.

DEMULCENT CLYSTERS.

(2)

Decoction of Marshmallows.

Take of, Marshmallows, dried ..... 2 ounces
Water ..... 3 pints
Boil to one half, and strain.

(3)

Decoction of Quince-Seeds.

Take of, Quince-Seeds ..... 3 drams
Water ..... $1\frac{1}{2}$ pint
Boil for ten minutes, and strain.

(4)

Decoction of Iceland Moss.

Take of, Iceland Moss ..... $1\frac{1}{2}$ ounce
Water ..... 2 pints
Boil to a pint and a half, and strain.

(5)

Decoction of Barley.

Take of, Pearl Barley ..... 1 ounce
Water ..... 3 pints
Boil to one pint, and strain.

DEMULCENT CLYSTERS.

(6)

Compound Decoction of Poppy.

Take of, Poppy-heads, bruised	2 ounces
Water	2 pints

Boil for a quarter of an hour, and dissolve in the strained liquid.

Compound powder of Gum Tragacanth	½ ounce

(7)

Starch Mucilage.

Take of, Starch	3 drams
Water	1 pint

Dissolve the Starch in the Water cold, and then boil it until it thickens.

(8)

Emulsion of Suet.

Take of Mutton Broth	1 pint
——— Suet	3 ounces

Beat the Suet with the Yolk of three Eggs, and incorporate it by trituration with the Broth; then gently simmer it together for ten minutes.

DEMULCENT CLYSTERS.

(9)

Emulsion of Wax.

Take of, White Wax ..... 1½ ounce
Milk ..... 1 pint

Beat the Yolk of two or three Eggs with an ounce of the Milk, and the Wax being melted, stir them together; then gradually add the remainder of the Milk previously made hot, and simmer the whole, very gently, for a few minutes.

(10)

Emulsion of Spermaceti.

Take of, Spermaceti ..... 1½ ounce
Gum Arabic (*in powder*) ..... 6 drams

Beat the Spermaceti with the Gum, and dissolve, by careful trituration in

Milk, (at 100° Fah.) ..... 1 pint

(11)

Emulsion of Flour.

Take of, Wheat Flour ..... } 1 ounce
Mutton Suet, of each ..... }
Milk ..... 1 pint

Rub the Flour with the Milk, cold, then put it over the fire and throw in the Suet; when the latter is dissolved, pour it into a proper vessel, and inject it as soon as it is cooled, down to 98°.

DEMULCENT AND ANTISEPTIC CLYSTERS.

(12)

Emulsion of Soap and Wax.

Take of, Plain Curd Soap	.....	1 ounce
White Wax	.....	2 ditto
Water	.....	1 pint

Boil them together till dissolved.

Any of these formulæ, particularly 8, 9, 10, 11, and 12, are highly eligible in Dysentery: they may be repeated twice or three times a day.

IX. ANTISEPTIC.

Take of, Fresh Yeast	.....	2 ounces
New Table Beer	.....	$\frac{1}{2}$ pint

Mix, and inject at a temperature of 100°.

This clyster is for the purpose of exhibiting carbonic acid gas with a view of correcting the septic tendency which displays itself in typhoid fevers.

X. NUTRIENTS.

Nutrient Clysters are administered for the support of the patient in cases of great debility and exhaustion, or when food cannot be received by the mouth or retained on the stomach, as happens from cynanche, stricture of the œsophagus, fever, and other diseases.

(1)

Cut a pound of *lean* beef into very thin slices, and put it into a quart of cold water; simmer it very slowly until one half is consumed; then thicken it with hartshorn shavings, or with arrow root: throw up a tea-cupful every two or three hours.

(2)

Dissolve a glass of jelly (or half an ounce of isinglass,) in half a pint of milk; throw up half this quantity, and repeat it frequently.

In cases of exceeding debility and the collapse attending typhoid and malignant fevers, it is usual to add bark to these nutrient clysters.

APPENDIX.

Experiments on the relative Proportions of the Ingesta and the Egesta, tending to shew that a Portion of the SOLID *Nutriment is eliminated from the System in the Form of Vapour, by a recombination of its Elements, subsequent to Digestion.*

BY .....*.

"THESE Observations were instituted for the purpose of ascertaining, principally, the proportions between some of the secretions, and the ratio which they bear to the nourishment taken for the support of life. The nature of such enquiries will naturally suggest to the reader, that the writer (at that time a student at one of the

* "* * * * * * * readily accedes to the author's request, through the recommendation of Sir A. Cooper, regarding the observations communicated to that gentleman in 1811, the writer being then one of his pupils; but wishes it to be understood he does so upon two conditions, which he takes the liberty of making indispensable—the first, that, having long since relinquished the intention of practising the profession, the results and observations now furnished, be published *without his name*—the second, that it be expressly stated in the work in which he understands it is proposed they should be inserted, that not having seen the manuscript, nor deemed it necessary (under this condition) to be informed of its details, he is to be considered as *wholly unacquainted* with that work, prior to publication,—by any of his private friends who may happen to recognise in the following abstract, the author of the 'Experimental Observations of 1811.'

hospitals in the metropolis,) was himself the subject of the experiments. From results, so obtained, he has drawn up the following abstract, in which, in order to render it perspicuous, many of the details have been omitted.

" The first branch of this enquiry relates to the proportion existing between the total quantity of fluids taken into the stomach, and the total of the fluid secreted by the kidneys; the period of observation being 28 days.

" It was found that the total of fluids drank, (being chiefly watery diluents and weak malt liquor) during 28 days, was 1274 ounces; or, upon the average, upwards of 45 ounces in the day and night.

" And on the other hand, that the kidneys during the same time, passed 1139 ounces; or, upon the average, upwards of 40 ounces in the day and night.

" Thus it appeared, that the fluid separated by the kidneys, was little short in quantity of that which was taken into the stomach. It therefore became a desideratum, to ascertain what loss the system might sustain by the lungs and skin, in an invisible form.

" During one period, this loss was found, on the average, to be 43 ounces in the day and night, that being the weight of water and carbon, (assuming that no other substances are volatilized,)

given off by the skin and lungs only. And if the carbon (emitted from the lungs) be reckoned as 8* ounces (avoirdupois), there will remain 35 ounces of water *perspired by the skin and exhaled from the lungs*, including the evaporation from the lachrymal, salivary, and mucous fluids, met with in the air-passages. Adding to this weight of 35 ounces, the 40 ounces secreted by the kidneys, the experimenter was surprised to find a total of 75 *ounces of fluid*, (chiefly water,) *given off during a period* in which *the quantity of water taken*, in the form of drink, did *not exceed* 45 *ounces*. The difference is 30 ounces *per diem*. This suggested to him a highly interesting question, namely, whether the living body might not be found to be endued with the faculty of ultimately expelling *in the form of* WATER, more or less of the elementary oxygen and hydrogen originally contained and combined, *(but not constituting water) in the* SOLID *food?* This question he endeavoured to elucidate in the following way, in his own person, being at the time in good health, and actively engaged.

"In the first place the exact weight of the body was noted. Secondly, the quantities of food, (all being solid, and of the usual kinds, but in less variety,) and of drink, were accurately as-

* "This may be deemed a low estimate of the carbon: it will be explained in the sequel.

certained and registered, during a period of seven days and nights. Thirdly, during the same time, the amount of the secretion by the kidneys, and also of the alvine* excretions, was recorded. And lastly, at the end of the period, the weight of the body (having on the same dress†, with the

* "There is not much difficulty in computing the weight of the alvine evacuation, without sacrificing a due regard to delicacy, if the following steps, which it will be excusable to detail, be pursued. 1st, The urinary bladder having been evacuated, the person should instantly ascertain his own weight by an accurate balance; noticing the precise time at which this is done. 2dly, Immediately afterward, the bowels are to be exonerated. 3dly, At the end of a certain period, suppose 15 minutes from the time of weighing, the observer will again take the weight of his body: the difference, between the first and second weights of his person, will indicate the amount of matter lost in the interval by the alimentary canal, lungs and skin. Now, the lungs and skin, during 15 minutes, can have given off only a small portion of matter, perhaps less than half an ounce; and, therefore, deducting half an ounce, the remaining figures may be considered as denoting the weight of the alvine evacuation. If, however, the subject has been sustaining more than the average loss by perspiration, he has only to ascertain the quantity of such perspiration, (and exhalation from the lungs,) by again weighing himself a third time at the end of the next 15 minutes, and then to make the necessary deduction for it.

† "Had the period of experiment been only a few hours, it would have been proper to take cognizance of the relative hygrometric state of the clothes, at first and at last; but it being extended to a week, this may be safely left out of the calculation.

pockets emptied as at first,) was again determined. The results were the following: viz.

	Avoirdupois wt. lbs.	oz.
Experimenter's weight at the commencement	137	12
Added, in seven days by Food	15	5½
Added, in seven days by Drink	19	10
	172	11½
Deduct experimenter's weight at the termination of the seven days	135	9
Total given off	lbs. 37	2½ or 594½ oz.*

"Hence, 37 lbs. 2½ oz. was the weight of all the excretions in one week, and they appear to have been in the following proportions:

	In one week.
By the kidneys	280 ounces.
Alvine excretions	12½ ——
	292½ ——
Remainder of the 594½ oz. considered as being, *Carbon* by the lungs; and *Water*, partly exhaled by the lungs, and partly perspired by the skin,	302 ——
Total in one week, 37 lbs. 2½ oz. or 594½ ounces.	

"These facts are interesting, but they are not sufficient for resolving the question, whether nascent water is given off by the living body. Some further data are requisite. *How much carbon was*

* "Neither cutaneous nor pulmonary absorption is noticed, because the weight of matter given off, must, of course, have been augmented *in the same* proportion.

expelled by the lungs during the seven days and nights? The researches of Allen and Pepys shew that the proportion of this carbon varies in different individuals: and Dr. Prout has proved that it varies at different times in the same individual: on these variations, may possibly depend the amount of caloric evolved as animal heat. But it will suffice for the present, to proceed on the assumption (for a reason assigned in the sequel,) that the carbon thrown off from the lungs did not exceed 8 ounces (avoirdupois) in the day and night, or 56 ounces in the week. Subtracting this from the 302 ounces passed by the lungs and skin, there remain 246 ounces, (or $35\frac{1}{7}$* ounces in 24 hours,) as the quantity of water lost by these organs.

"Another datum required for an exact calculation, is the proportion of *water remaining in the*

* "There is one fact which should be stated here, as it serves to give an approximation to the quantity of water thrown off by the lungs. In the year 1811, when these experiments were undertaken, the writer, by condensing the vapour of his breath, obtained 316 grains of water in 70 minutes, which is at the rate of nearly 15 ounces (avoirdupois) in 24 hours. It was not quite all (though nearly all) that was expelled in the breath; but then it should be recollected on the other hand, that, although respiration was permitted to take place by the mouth only, a portion of water must have been derived by evaporation from the saliva and mucus, over which the air passed in its way to and from the lungs.

living body, (whether constituent or contained,) and as it is one which never can be known, it is noticed here merely to remind the reader that it is subject to fluctuation, and that, therefore, to avoid any considerable error, the duration of experimental observations of this kind, should not be short. In the instance under consideration, the period extended to one week only.

" It is now necessary to form an estimate of the quantity of *water contained in the week's food.* The writer's experiments lead him to consider that scarcely so much as $\frac{40}{100}$ of the 15 lbs. $5\frac{1}{2}$ oz. food, was anhydrous matter, the remainder being water. The food is therefore estimated as consisting of six pounds anhydrous matter, and nine pounds five and half ounces water.

" With regard to the solid matter contained in the drink, it may be considered as nearly equivalent to that which passes off in the secretion by the kidneys, as determined by Berzelius: and to simplify the calculation, both fluids may be regarded as mere water.

" The foregoing results, if adapted to these views, should be arranged as follows:

		Ounces.		
Expended: Water ...	Passed by the kidneys...	280		
	Passed by the lungs and skin (302, less 56 carbon)	246		
	Supposed, (merely supposed, as constituent) in the 12½ alvine matter	7	oz. =533.	Total water *given off.*
		Ounces.		
Received: Water ...	As a constituent of the food, 9 lbs. 5½ oz. or ...	149½	oz. =463½.	Total water *received.*
	As drink, 19 lbs. 10 oz. or	314		

Excess of water, 69½ ounces.

But as the body at the end of the week, was found to have sustained a loss of 2 lbs. 3 oz. or 35 ounces, let it be assumed, (with the certainty, that, if an error exist, it is on the safe side,) that this loss was wholly water, and therefore deduct it all ..... 35 ounces.

Excess of water, *expended* in one week, 34½ ounces.

"Thus it appears, that in the period under consideration, more water was given off than received, by at least 34½ ounces, being an average of nearly five ounces *per diem.* Before, however, admitting so important a conclusion as this involves, the reader will perhaps take the pains to review such of the premises as do not consist of simple facts, and may fairly be received as uncertain. And, first, as to the carbon expelled by the lungs; could it exceed the calculation, so as materially to reduce the remaining figures set down as water? It is thought it could not, because 56 ounces of carbon is over, rather than under, the quantity to be presumed as existing in six pounds (or ninety-six ounces) anhydrous matter of the

food: and with regard to some portion of carbon which may be supposed to be furnished from the materials of the living body, it is, in the preceding calculation, already more than compensated by assuming the 35 ounces loss in weight, as *wholly water*.

"In the next place, was there any obvious reason to conjecture the existence of *less* water in the body at the termination than at the beginning of the week? None, in this instance, excepting the ultimate waste (35 ounces) in the experimenter's weight, just adverted to as duly taken into the account. But as variations in this respect must sometimes happen, it is proper to mention, that on comparing these results with others not here reported, the coincidences are very striking, a remark that will also be found to apply to the facts stated in the outset of this paper, which relate to the fluids only, but which embrace the lengthened period of 28 days.

"Again, as to the amount of solid matter passed by the kidneys, and that received with the drink, there does not appear any reason to be dissatisfied with the crude expedient of balancing the one against the other.

"The reader will have noticed the *assumption*, (page 175,) that no other substances are volatilized in the ordinary state of the animal economy, than water and carbon.

"Such are the possible sources of fallacy in this disquisition; but after all, the nature of the enquiry, so far as the amount of the loss is concerned, readily admits of practical repetition by any one who may find leisure to undertake it. In the mean time, the writer is inclined to offer a few arguments, some of which being facts, serve by analogy, to favour the supposition which was suggested, *that water is generated by the animal body, such water resulting from the union of elementary hydrogen and oxygen originally contained, and combined, but not as water, in the food: and further, that this water is given off by the lungs in a* nascent *state.*

1. "Some vegetable principles, in the progress of decay, give off carbon to (form carbonic acid with) the contiguous atmospheric oxygen; and *at the same time water is generated* from their elementary oxygen and hydrogen.
2. "In the growth of certain vegetables, *water is decomposed,* or, at least its elements are so appropriated as to form (with carbon) *anhydrous* vegetable matter: *e. g.* Those plants whose only pabulum are water and carbonic acid.
3. "During the process of malting, the grain, while yielding carbon to the oxygen of the air, *also generates, from its own elementary oxygen and hydrogen, a portion of water:* or, in other

words, nascent water is produced simultaneously with the evolution of the carbon, from the same seed.

4. "The elimination of *so much carbon* by the lungs, argues the simultaneous formation of new compounds from the *same portion* of blood; that is, *while within these organs*. One of these may be water.

5. "The exhalation of water from the lungs cannot be a process of simple evaporation from a secretion on the surface of the air-cells,* for otherwise therewould accumulate an inevaporable residuum, which is not the case when the lungs are in a healthy state. *It is a true exhalation*, an evolution of water in the state of vapour: and if the writer, after adducing the preceding facts, be allowed to offer a theory, he would suggest, whether this may not be *nascent water*, resulting from the decomposition of a compound existing in venous blood, the hydrogen and oxygen recombining, but assuming the state of vapour, at the same moment the carbon of the compound unites to the atmospheric oxygen? There is, indeed,

* "It was not till some time after the above was written and waiting for the press, the writer learned that Dr. Edwards, in treating of the aqueous vapour which comes off with the breath, concludes that 'the lungs transpire only by means of evaporation, and not by transudation.'"

another important ingredient, azote, not here noticed; but our knowledge respecting it is very limited. The reader may, however, recollect that azote, as a large constituent of *urea*, is constantly passing off by the kidneys.

6. "The *simultaneous evolution*, by the same portion of blood within the lungs, *of nascent water as well as carbon*, (if it really take place,) may, by means as yet unknown,* be one of the provisions for influencing, and at all times regulating with such admirable precision, the temperature of this vital fluid, notwithstanding any variation in the quantity of consumed carbon, and consequently of liberated caloric."

* "Not, however, forgetting the beautiful theory of Crawford."

THE END.

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